

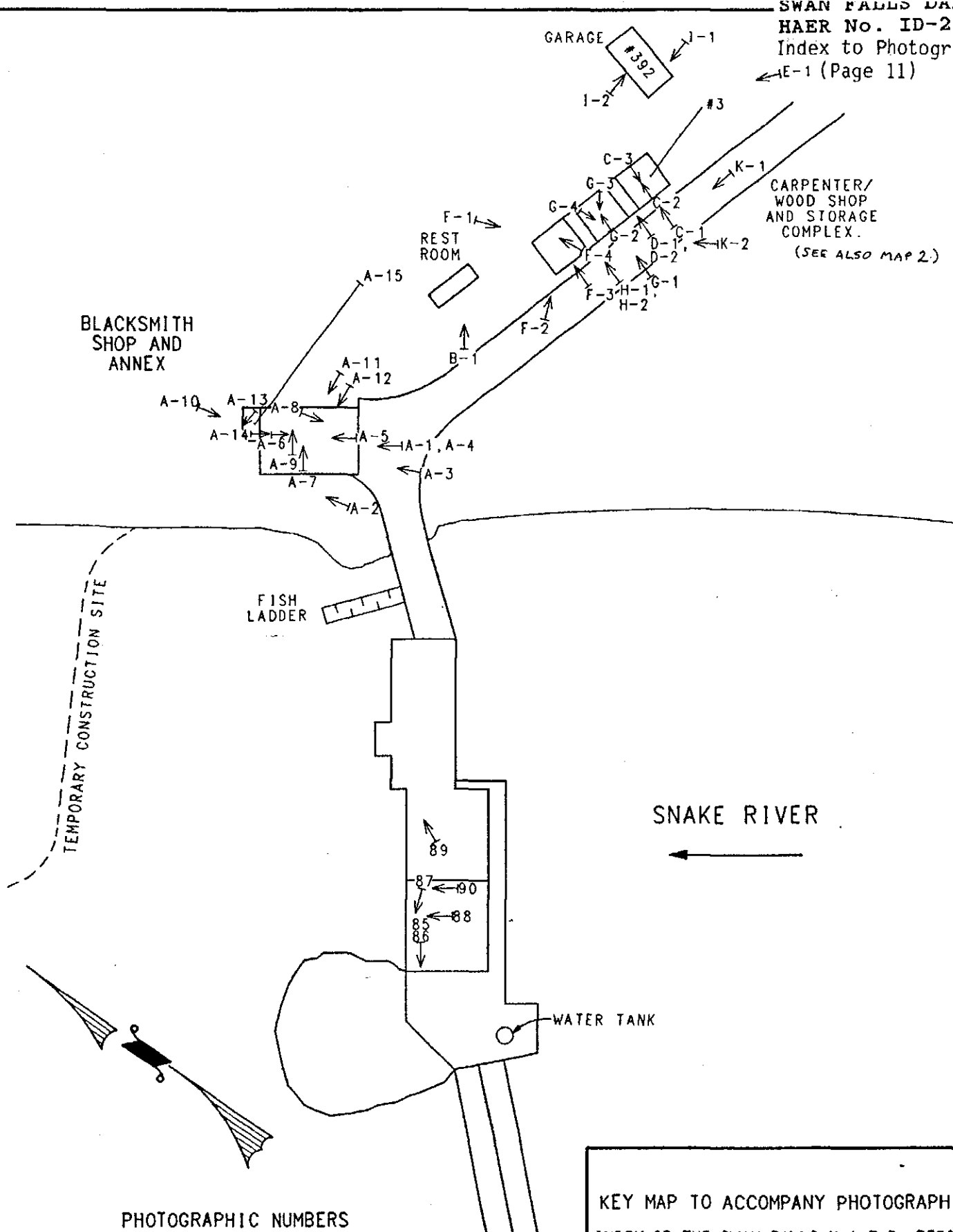
Swan Falls Dam
Spanning Snake River
Kuna Vicinity
Owyhee County
(Ada County)
Idaho

HAER No. ID-20

HAER
ID,
37-KU.V,
1-

PHOTOGRAPHS
WRITTEN HISTORICAL AND DESCRIPTIVE DATA
FIELD RECORDS

Historic American Engineering Record
Western Regional Office
National Park Service
U.S. Department of the Interior
San Francisco, California 94102



PHOTOGRAPHIC NUMBERS

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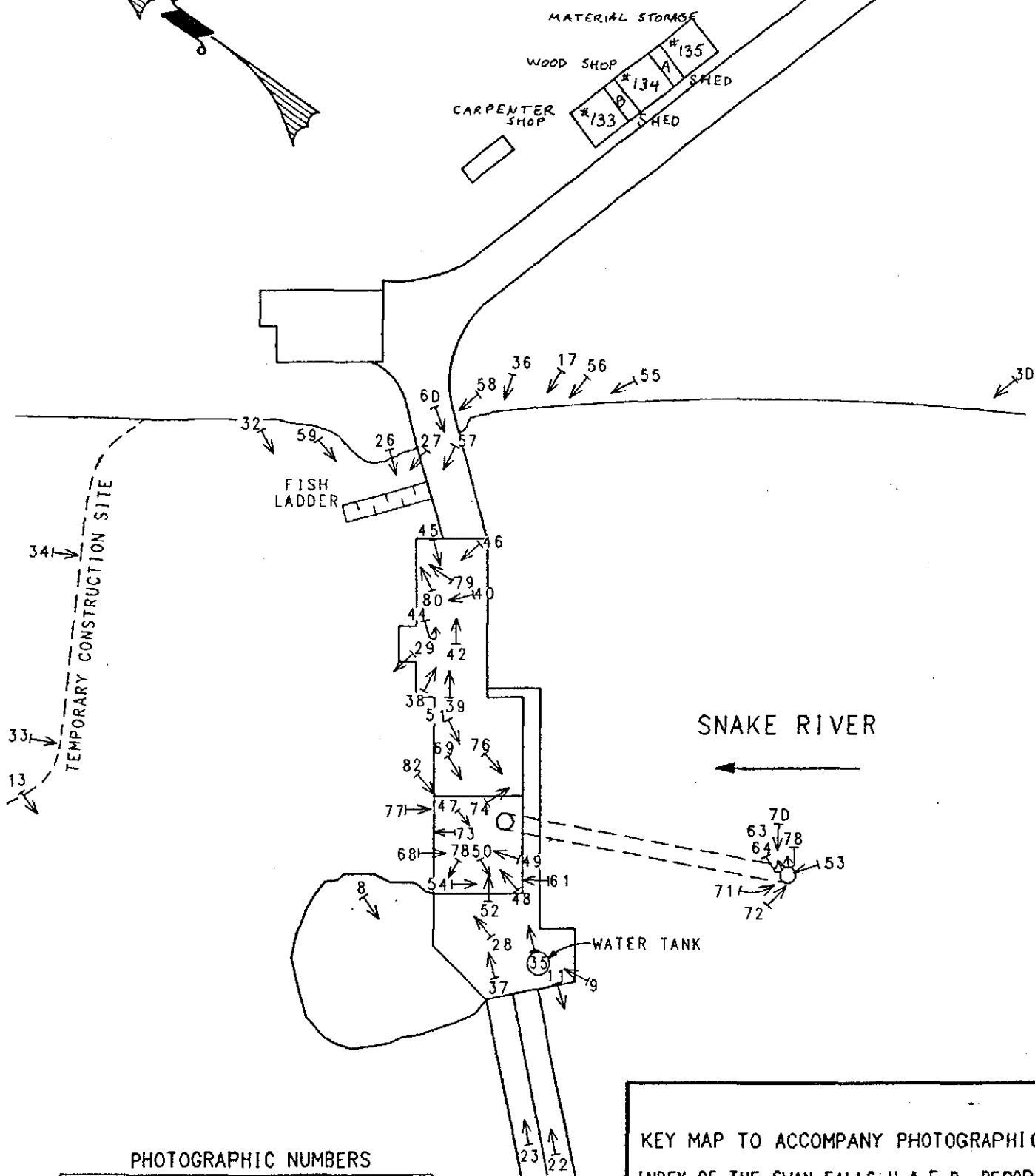
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SWAN FALLS DAM
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HAER-ID-20

SCALE:

DATE: 11-13-90

CAD-A-730 SWPO MAP2

HISTORIC AMERICAN ENGINEERING RECORD

HAER
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Swan Falls Dam

HAER No. ID-20

Location: Spanning the Snake River, about 40 miles southwest of Boise, Idaho, and 18 miles south of Kuna, Idaho, in the SE 1/4 of Section 18, Township 2 South, Range 1 East, Boise Meridian, UTM: 11/550520/4787860 Owyhee County is on the southwest left bank; Ada County is on the northeast right bank

Date of Construction: 1900-01; altered in 1907, 1910, 1913, 1918, 1921, 1936, 1944, 1986

Designer: Andrew J. Wiley

Builder: Trade Dollar Mining Company, Silver City, Idaho

Present Owner: Idaho Power Company, 1220 Idaho Street, P.O. Box 70, Boise, Idaho 83707

Present Use: Hydroelectric power generation

Significance: Swan Falls Dam was the first hydroelectric dam on Snake River in Idaho, and one of the earliest built in the Pacific Northwest. A. J. Wiley, a brilliant western irrigation engineer and an early assistant of engineer Arthur D. Foote, designed the project. The dam was built to supply power for the operation of gold mines in Silver City, Idaho, which has long previously run out of wood for fuel. It soon supplied power for Silver City, Nampa, Caldwell, and other Idaho towns. The Idaho Power Company, which acquired the dam in 1916 during a major consolidation of southern Idaho power companies in receivership, expanded the capacity of the dam and added new equipment in two phases. Swan Falls was used as a training assignment for new engineers in the Idaho Power Company system because of the variety of manually-operated equipment at this site, including generators installed in 1918. Because the water rights for the dam were never subordinated to those of future irrigation projects upstream, Swan Falls was the focus of a major conflict in water use and water rights in Idaho during the 1970s and 1980s, the resolution of which has profoundly altered the course of economic development and water use in southern Idaho.

Report prepared by: Susan M. Stacy, Consulting Historian
1718 North 17th Street
Boise, Idaho 83702

Date: January 1991

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PART ONE

INTRODUCTION

Swan Falls Dam is ninety years old. Its historical significance falls into three periods in the history of the electric industry in Idaho: the mining and traction era between 1900-1916, the irrigation and expansion era of 1916-1977, and a recent era of competition for the Snake River's water which began in the mid-1970s, and which involved Swan Falls Dam in particular after 1977.

During the period 1900-1916, the dam was the first hydroelectric dam built in Idaho and on the Snake River and supplied the first long-distance transmission lines. It made possible the full development of the gold mining potential of the mountains near Silver City, Idaho, between 1900 and 1910. Its power contributed to the development of traction trolleys in the Boise Valley, to the development of irrigation in the Gem Irrigation District, and to the lighting of many small towns in the area. Further, the construction of the dam in a physically challenging and isolated part of the country is a tribute to the ingenuity, courage, and optimism of its builders and the pioneers of the State of Idaho.

In 1916 Swan Falls became the property of the Idaho Power Company and was incorporated and interconnected into a unified system of electrical generation and transmission operated by that company in a region stretching from eastern Idaho to eastern Oregon and including small parts of Nevada. Swan Falls was for many of the Company's early years the single largest power generating facility on the system. Up until 1945, Idaho Power Company installed various improvements to increase the generating capacity of the dam. Meanwhile, irrigated agriculture and the electrical power industry each stimulated the growth of the other all across southern Idaho.

From 1977 to the present and into the future, the significance of Swan Falls lies in its early approval in 1900 before the full-blown development of the irrigation industry in Idaho. None of its water rights or other permits were conditioned upon any requirement to subordinate those rights to other types of users who would come later - in particular, irrigators upstream. Later dams built on the Snake for hydroelectric generation, including the great Hells Canyon dams, all contained a provision that in times of short water supply, upstream irrigation needs would be superior to those of the power dams, even though the irrigators rights were not "first in time."

A complex series of events was set off in 1974 when the Idaho Power Company proposed to construct Pioneer, its first

thermal generating plant in Idaho. The resulting debate brought into sharp focus, for perhaps the first time in the history of the state, a view that the water of the Snake River, however abundantly it may flow, has finite limits. It became clear that the Snake would not be able to support an infinite expansion of irrigation in south Idaho, and that one of the costs of continued irrigation expansion appeared to be at the expense of all the ratepayers of the Idaho Power Company, who would have to pay for expensive thermal power to replace the cheap hydroelectric power.

The year 1977 was the date of significance for Swan Falls Dam in particular because that was when a group of ratepayers complained to the Idaho Public Utilities Commission that the Company, by permitting the hooking up of new pumping facilities for irrigators upstream of Swan Falls Dam, was failing to defend its Swan Falls water rights. As the flow to Swan Falls diminished, there would be less generating potential at the dam and at three other hydroelectric dams downstream in Hells Canyon. Eventually the ratepayers would have to pay for this loss in higher rates for thermal electric generation.

The Idaho Public Utilities Commission denied Pioneer; the progress of new irrigation development was interrupted; a series of threatened lawsuits were negotiated away; an adjudication of all water rights in the Snake River Basin began; and the era of unquestioned superiority of irrigation claims on the Snake River ended. The adjudication will take many more years before it is finished; therefore, the long-term meaning and significance of the Swan Falls Complaint and the Swan Falls Agreement that temporarily settled the issue will more completely be known in years to come.

PART TWO

DESCRIPTION OF THE SITE

The Snake River rises in the mountains of western Wyoming and eastern Idaho and flows across southern Idaho in a south-dipping arc towards the west. It turns sharply north not too far from the western edge of Idaho and becomes the boundary between Idaho and Oregon. At Lewiston, Idaho, the Snake turns west again and empties into the Columbia River in western Washington.

The Swan Falls site is in Southwest Idaho in the western part of Snake River's arc across the state. The Snake has just made a bend so that the water flows from a southerly to a northerly direction. The river forms the boundary between Owyhee County to the south and Ada County to the north. The river flows through a spectacular vertical-walled canyon six to seven hundred

feet high. The geologic formations are a series of lava flows interbedded with sedimentary layers. Some of the basaltic lava eruptions occurred while the area was submerged, resulting in layers of "pillow lava." One of the more colorful formations in the canyon is a red-purple flow known as Rosette-Spar basalt. Between the canyon walls and the river itself are huge mounds of talus.¹

The rough exposures of lava in the canyon walls provide ideal nesting sites for the rearing of prairie falcons, golden eagles, ferruginous hawks, and a remarkable variety of other raptors. In the warm arid climate, thermal air currents carry the birds up and out of the canyon to the deserts to the north and south, where they prey on Townsend ground squirrels and other desert inhabitants. Swan Falls Dam is located within the Snake River Birds of Prey Area, a federally designated preserve first established in 1971 and expanded in 1980 to include a total of 482,640 acres along an 80 mile stretch of the river. Morlan Nelson, a world-renowned expert on falcons and other raptors, and his sons have assisted the Walt Disney Studio and other production companies to make several films about eagles and hawks in this part of the canyon.²

Around fifteen thousand years ago, Pleistocene Lake Bonneville (of which today's Great Salt Lake is a remnant) eroded an opening through Red Rock Pass, about three hundred miles upstream from Swan Falls, producing the second largest catastrophic flood known in geological history. The flood seized huge lava boulders from canyon walls far upstream from Swan Falls, carried them down river, and dropped them in piles whenever the canyon widened and the water slowed slightly. Just downstream from Swan Falls Dam a few miles is one of these areas. The polished surfaces of the boulders, known as melon gravel, made fine canvass for prehistoric Indian petroglyphs.

¹ Malde, Harold E. "A Guide to the Quaternary Geology and Physiographic History of the Snake River Birds of Prey Area, Idaho," in Spencer Wood, Northwest Geology, Fieldtrip Guidebook, 1987 Rocky Mountain Section Meeting, AAPG-SEPM, Vol.16, p. 23-46.

² See Disney, "Ida the Offbeat Eagle," True Adventure Series; NBC General Electric Television Special, "The Eagle and the Hawk," with Morley Nelson, Joanne and Nell Woodward; Mutual of Omaha's Wild Kingdom, three episodes; WNET Public Television, "Rulers of the Wind," Nature Series with George Page; National Geographic Explorer, "The Falconer;" Nature Conservancy film, "The Snake River Birds of Prey Natural Area;" Idaho Public Television, Outdoor Idaho, March 1986; #505 March 1988; #704, Jan. 1990; #802, Nov. 1990 - each features Snake River canyon at or near Swan Falls, birds of prey, or Morley Nelson.

Beyond the canyon rims and deserts to the southwest lie the Owyhee Mountains, and to the northeast, the Danskin Mountains. As one drives south to the site of Swan Falls Dam from the town of Kuna (on one of those perfectly straight roads possible only in the West), one sees on the west the Kuna shield volcano, a low, broad bulge against the distant purple skyline of the Owyhees. Irrigated farms give way to the sagebrush desert, the paved road turns into gravel. A dramatic landmark rises up out of the sagebrush flat to the east - a volcano plug partially surrounded by a crater rim. This is Initial Point, the place where the first Idaho surveyors began their measure of the townships and ranges of the state.

The road comes to the dedication point for the Snake River Birds of Prey Area, which offers a view of the remarkable formations in the south canyon wall. Further along the road it is possible to see Swan Falls Dam astride the river before descending down the grade into the canyon. When the dam was built there was no town or village nearby, and none has ever grown up around the area. The only structures are the dam, powerhouse, residences for employees, and assorted workshops, storage buildings, ferry landings, and other miscellaneous appurtenances to the project. The collection of buildings became known by employees as "Swan Falls Village," but it is not an incorporated place. Today, employees receive their mail at Kuna.

The dam was built on the upstream edge of a solid basalt ridge extending across the bed of the river, just below which a series of low rapids fell about fifteen feet. A high point jutted up out of the water as an island in the middle of the stream, sometimes called a "promontory" by early engineers. Between this island and the left bank there is a deep crevice in the lava, which later gave dam builders considerable aggravation when they struggled to place the last section of the spillway.

Most probably, the site got its name from a prospector named P.M. Swan, who located a placer mine not far from the rapids. Another notion is that it came from trumpeter swans that used to be seen there. However, there is a record of prospector Swan's claim filed in June of 1892 and called the Poor Man's Mine.³

³ Todd Shallat, ed. Prospects, Land Use in the Snake River Birds of Prey Area, 1860-1987. (Boise: Boise State University, 1987.), Appendix A, p. 115.

PART THREE

SILVER CITY AND THE TRADE DOLLAR MINE

There is a story in Idaho lore that an 1840s party of Oregon-bound emigrants who were crossing the high mountain desert country of what is now Owyhee County found nuggets in a creek and used them as fish line sinkers. Once on their way again, the party tossed the nuggets in an old blue bucket and used them again and again as they made their way west. Someone in Oregon eventually recognized the nuggets as gold, but by then it was too late to remember exactly which creek they had come from.⁴

The Blue Bucket legend grew. In 1863 it inspired Michael Jordan to lead a party of twenty-eight miners from Walla Walla to search the Owyhee country for the source. They discovered placer gold, although not in the form of sinker-size nuggets, on Jordan Creek. When they journeyed on to Placerville in the Boise Basin for supplies, their news started a rush.

In short order, the miners organized a mining district and the towns called Booneville and Ruby City on Jordan Creek. They found rich quartz veins of silver on War Eagle Mountain. Timber, sparse to begin with, was completely gone in six months. Until enterprisers could organize the hauling of timber from further away, people lived in dugouts and rock shelters. The chronic shortage of wood and the increasing cost of freighting it long distances was to become one of the reasons for the eventual construction of the Swan Falls power plant.

Jordan sent for his friend William H. Dewey, then at Virginia City in Nevada. An energetic promoter, tall and substantial in bulk, Dewey liked to wear a two-carat diamond in his shirt when he could afford it. He enjoyed being called Colonel Dewey. Now, however, he arrived in Idaho on foot and with \$27 in his pocket. He began immediately to build a toll road along Jordan Creek north toward Boise, the territorial capital, and laid out a new town called Silver City higher up on Jordan Creek.⁵ (See vicinity map in Appendix F.) By 1866, the population of the area was about 5000.

Things went well at the mines until around 1875, when the Bank of California, the main source of operating capital at

⁴ Julia Conway Welch, Gold Town to Ghost Town, The Story of Silver City, Idaho. (Moscow, Idaho: The University Press of Idaho, 1982), p. 9. See also Mildretta Adams, Historic Silver City, The Story of the Owyhees (Nampa, Idaho: Adams, 1969) p. 3.

⁵ Faith Turner, "The Fabulous Colonel Dewey, Part One," Scenic Idaho (Mar-Apr 1953), p. 9.

Silver City, failed. Relatively few mines were locally owned and able to continue operating. During the subsequent money crisis, no one could find much capital to continue mining, so Silver City mines filled with water, and equipment was left to ruin.⁶

The mines would revive in 1890, but during the hiatus, William Dewey bought, sold, and developed claims. He also crawled around on Florida Mountain near Silver City (on knee pads made for him by his wife) and located wider and deeper ore veins than those of War Eagle Mountain. Whenever he needed capital for one of his other promotions or to pay off debts, Dewey would sell off one or more of his values.⁷ In 1890 he bought the Trade Dollar from Frank St. Clair and James Douglas. Probably in 1891, when he needed money for a railroad project, he went to Pittsburgh to do some promoting. He sold the Trade Dollar and other mines "for millions" (according to local speculation), to Andrew Mellon, J.M. Guffey, Aaron French, Thomas McKay, and other investors.⁸ They incorporated in Kentucky as The Trade Dollar Consolidated Mining and Milling Company.

Over a period of its twenty-five year life, the Trade Dollar surrendered over thirty million dollars in gold ore. Owyhee County led the state of Idaho in the production of gold from 1903 to 1910, thanks largely to this mine. The Trade Dollar was one of the most extensively developed mines in Idaho, with its lowest level driven 11,000 feet down to a depth of 1700 feet. The mine had more than five miles of tunnel and drifts. After 1907 the vein pinched out to a lower grade of ore and the mine closed in 1910.⁹ By this time most of the other mines had also played out, and Silver City gradually became a ghost.

PART FOUR

THE BUILDING OF SWAN FALLS DAM AND POWER PLANT

In 1894 visionary engineer Arthur D. Foote was looking for a way to get electricity to Silver City, which in its rejuvenation

⁶ Adams, p. 26-27.

⁷ Faith Turner, "The Fabulous Colonel Dewey, Part Two," Scenic Idaho (May-June 1953), p. 21.

⁸ Welch, p. 52. Sources differ as to the date of the sale. However, the Pittsburgh investors incorporated their Trade Dollar company in July of 1891 in Kentucky, according to the Owyhee County Blue Book.

⁹ Welch, p. 85.

certainly had the means to pay for electrical power. He searched for a head of water going to waste and found one at Thousand Springs on the Snake River, but it was "a hundred miles from anywhere." The Westinghouse people told him that electricity could be carried that distance, but that it had not been done before.¹⁰

Foote next went to Swan Falls, this time taking his young assistant Andrew J. Wiley with him. There he located a site for a power dam only twenty-eight miles from Silver City, but "nobody would look at it then," according to Foote's wife Mary.¹¹ Foote soon left Idaho, but Wiley stayed on. When the Pittsburgh interests were ready to consider electricity, they asked Wiley to design and build the project.

Mary Foote characterized Wiley as a quiet competent engineer who "outstripped us all on the road to success, yet so modestly and in ways so technical and unadvertised that I think only the profession knows him outside Idaho, his chosen field, where he outstayed failure and came into his own as one of the country's great hydraulic engineers."¹² By the time of his death in 1931, the publicity-shunning never-married engineer had been involved as advisor in nearly every major irrigation project in Idaho and Eastern Oregon, for Boulder Dam, and for large projects in Calcutta, Puerto Rico, and California.¹³

With the successful transmission of hydroelectric power from Niagara Falls to Buffalo and from Oregon City to Portland in the Pacific Northwest, the Pittsburgh investors decided to exploit the potential in the Snake River. In 1898 they sent L.B. Stillwell, electrical manager of the Niagara Falls Power Co. and Thomas T. Johnson, a hydraulic engineer from Chicago, to Silver City as their consultants. Stillwell and Johnson endorsed the Foote-Wiley Swan Falls site. There was plenty of water, a natural fall, and a good foundation. A.J. Wiley, with F.C. Horn, designed and built the dam in the spring of 1900, along with the

¹⁰ Mary Hallock Foote, A Victorian Gentlewoman in the Far West, Reminiscences of Mary Hallock Foote. (San Marino, California: Huntington Library, 1972), p. 371-372.

¹¹ Foote, p. 372.

¹² Foote, p. 282.

¹³ Andrew Jackson Wiley's obituary is in Idaho Daily Statesman for October 9, 1931, p. 1. He was born July 15, 1862, graduated from Delaware College in engineering, went to work for Arthur Foote in Idaho in 1883, and remained based in Idaho.

two consultants.¹⁴

The plan had three main parts. First there would be a concrete dam on the river channel between the right bank and the rock island. This would be a buttressed wall 288 feet long and would close the river channel on that side. The powerhouse would be 136 feet long and sit partly on the island and partly on the concrete dam. It would be divided into bays for four turbines. A rock-filled timber-crib spillway dam would be placed between the island and the left bank. It would be 12-16 feet high and 450 feet long. Its function would be to raise the water level, create a head of about 17 feet for the turbines in the powerhouse, and provide a waste-way for water not needed to go past the turbines. There would also be a fish ladder.¹⁵

The first problem was to provide access down the near-vertical walls of the canyon, since there were no roads into it or any other nearby settlements where boat or barge traffic might supply access. Supplies would come from the north, hopefully from the Oregon Short Line Railroad fourteen miles away at Mora Siding (near Kuna). The company built a wagon road from there to the rim of the canyon and then blasted a roadbed down the walls of the canyon. The men cleared a campsite and installed tent-houses, a mess hall, a steam heating plant, toilets and showers. They created an equipment and storage yard, a cement plant, and set up a crane and light rail tracks to help move the turbines and other machinery. Construction began in the summer of 1900. Most of the plant and the concrete dam was completed by December.¹⁶ Since there were no dams upstream on the Snake, the low water period of the fall and early winter was the ideal time for construction.

After first placing a coffer dam, the company built the concrete dam to close off the river between the right bank and the island. To provide space for the turbines, they excavated pits and tunnels in the lava island. They built the powerhouse out of large concrete blocks made on-site. The 6000 barrels of

¹⁴ T.R. Heikes, "History of the Swan Falls Power Development," Book 1, History of Swan Falls, Nov. 12, 1973, p. 1. This series of notebooks is at the Idaho Power Company Library.

¹⁵ A.J. Wiley, "Specifications for the Construction of a Dam upon Snake River for Trade Dollar Mining Company prepared for approval of the State Engineer." Copy in file "Swan Falls Island, Generation Engineering Department, Idaho Power Company. See Appendix B for information about fish ladder.

¹⁶ James L. Huntley, Swan Falls, A History of the First Hydro-electric Power Plant on Snake River 1899-1901 (Boise: Idaho Power Company, n.d.), p. 4.

cement weighing 2,256,000 pounds have been thought by Company engineers to have come from England via Cape Horn, although in Wiley's application to the State Engineer for a permit to build the dam, he stated that the cement would be "the best domestic Portland cement." The cement was all mixed by hand labor with gravel mined at the site.¹⁷

The powerhouse was 50 feet wide and built to contain three 300 kilowatt, 2-phase 500 volt alternating current generators. These were belt driven from a main line shaft driven by four McCormick vertical turbines, bevel geared to the shaft. The head through the turbines was seventeen feet.

Spillway construction to the left bank proceeded by bolting timbers to the rock bottom, filling in behind them with rock, and then covering it over with timbers. According to Wiley, the "overflow slope is 45 degrees covered with 10-inch timbers" and a horizontal apron of 10-inch timbers parallel to the crest, laid close, and drift-bolted to 10 x 16 timbers which form the base of the cribwork.¹⁸

As the work progressed to its completion, the powerhouse was nearly done, and two of the generators and the switchboards were in place. Now the crew had trouble closing the last thirty feet of the spillway because of the large crevice on the left side of the river bed. They made repeated attempts to lower rock-filled timber cribs into the gap, but failed each time as the concentrated river current spit them right back out. With advice from a consulting engineer from Chicago and a river pilot from Pittsburgh, Wiley's crew built a monster crib 16 feet deep, 40 feet long, and 20 feet wide. They braced the 12 by 12 timbers with steel rods, and planned the launch. A witness said that the atmosphere at the evening meal the night before was "tense."¹⁹

The next morning a fifty-man crew guided the crib into the stream using a pair of three-inch hawsers, each anchored to a snubbing post on each shore. The river pilot accompanied the crib in a rowboat and shouted orders. As the crib entered the swift current it "struck a submerged rock, teetered crazily and

¹⁷ Heikes, p. 2, writes of his view that the cement was imported. See Andrew J. Wiley, "Specifications for the Construction of a Dam Upon Snake River for the Trade Dollar Consolidated Mining Company, Prepared for the Approval of the State Engineer." No date, but the plans were approved by D.W. Ross on July 10, 1900.

¹⁸ Wiley, "Specifications."

¹⁹ Huntley, p. 5. The witness was Lem York, editor and publisher of the Owyhee Avalanche.

swung partly around, jerking loose the guy hawser on the north shore. The snubbing post smoked from the terrific friction. The crib then floated on without guide ropes and entered the gap in the dam cornerwise instead of broadside as originally intended. However it served its purpose. It blocked the gap. Immediately tons of rocks were dumped into the crib from above, where track had been laid and crews were waiting with cars of rock ballast."²⁰

Water began to fill the reservoir and soon was high enough to flow through the turbines. The first hydroelectric dam in Idaho produced its first power in 1901.

Transmission lines - the first in Idaho - of 22,000 volts traversed twenty-seven miles between the dam and Dewey, a small town Colonel Dewey had named after himself, and from there the Trade Dollar company distributed it to Silver City, the Trade Dollar, and other mines on Florida Mountain. Between 1901 and 1908, the Trade Dollar built eleven miles of branch lines to the Black Jack, Banner, DeLamar, and Rich Gulch mines.²¹ The electrical power was much less expensive than the steam power heretofore used. It drove air compressors, power drills, pumps and stamp mills, and provided light to the mines and to the towns of Murphy, Silver City, and Dewey, and in one case provided space heating. By 1904 it also powered the electric trolleys which replaced mules in hauling ore from the mines.²² Silver City was booming.

In 1904-05 the owners of Swan Falls had to fight off a con-artist scheme not unusual in the mining west. An attorney named Alfred A. Fraser and his associates A.R. Crusen and Fred B. Whitin filed for water rights on the Snake with a plan to divert water from each bank just above the Swan Falls Dam. The idea was to pass the water through a pair of ditches that would go around the abutments to the dam, pass through a powerhouse on each side, and then flow back into the river. This would allow them to take advantage of the Trade Dollar's investment in having raised the level of the river, and "annoy the company as much as possible in the hope of being bought off," as the Trade Dollar attorney put it. The Trade Dollar decided not to play the sucker and filed an injunction against the trio. The judge rejected the mischievous

²⁰ George C. Young and Frederick J. Cochrane, Hydro Era, The Story of Idaho Power Company (Boise, Idaho: Caxton Printers, 1978), p. 23. Story is in the words of Lem York.

²¹ Heikes, p. 2.

²² See Silver City Nugget, April 10, 1903, and July 22, 1904.

plan and the Trade Dollar never did pay the rascals off.²³

In 1906 the Trade Dollar built a 44,000 volt transmission line from Swan Falls to Nampa, on to Caldwell, and then in 1907 to Pierce Park, which was an amusement and picnic area between the town of Caldwell and Boise on the Boise River and six miles west of Boise. (Today this is the site of the Plantation Golf Course.) This line supplied power for an interurban traction line between Boise and Caldwell. The company sold power at wholesale rates to existing distributors, but did not build any distribution systems of their own.²⁴

The terrain between the Snake Canyon and the high desert mines was severe in the winter, with snow drifts sometimes high enough to cover the transmission wires. The Trade Dollar built refuges for line patrolmen, who traversed their route on snowshoes. This old line was torn down in the mid-1930s, and power service to Silver City ended.²⁵

PART FIVE

SWAN FALLS EXPANDS

The population of the Boise Valley grew rapidly with the expansion of irrigation brought about by the Reclamation Act of 1902. In 1900 there were 1600 farms in the valley and by 1920 there were three times that many.²⁶ Along with the new farms and growing towns came a demand for more and more electricity. In 1907 the Trade Dollar installed two 650 kilowatt 2-phase 550 volt generators at Swan Falls, each driven by two Dayton Globe Iron Works vertical turbines, bevel-gearred to the generators. These were housed in a new concrete building which adjoined the original powerhouse to its east, and was larger than the first

²³ To Frederic Irwin, Gen. Mgr, Trade Dollar, from R.H. Johnson, November 2, 1904; to Frederick Irwin from J and J, December 27, 1904, MS 69; Trade Dollar vs. Fraser and Crusen, 9th Judicial Circuit Court, Case #1305, 1906. Trade Dollar Papers, Box 4, File "J and J," Idaho Historical Society. Court case decision is in Box 7.

²⁴ Heikes, p. 2.

²⁵ Welch, p. 91.

²⁶ Neil H. Carlton, A History of the Development of the Boise Irrigation Project. Masters thesis, Boise State University, 1969, p. 124-125.

one. This section of the powerhouse is still referred to as the "Dayton Globe section."²⁷

Materials to construct this addition were to come from the railroad siding at Murphy on the south side of the river, so the Trade Dollar built a road down the vertical face of the canyon on that side. (This road is visible at the left edge of Photograph No. ID-20-1.) The crews hauled the heavy equipment across the reservoir on barges and a ferry. They situated the powerhouse somewhat further downstream from the first building and placed its foundation on the five foot thick wall of the concrete dam and its buttresses. They excavated under and below the dam for the wheel pits and to provide an outflow for water through the draft tubes. The building was 130 feet long, 34 feet wide, and 90 feet high. The equipment rests on steel I-beams laid into the reinforced concrete floor. They had to cut through the five foot wall of the old concrete dam in order to let water through to the turbines, a difficult piece of work, as the upper part of the wall had to be bulk-headed and then the concrete drilled out slowly.²⁸

The bevel gear on top of the turbine shaft consisted of an iron casing in which large wooden teeth were wedged. When lightning caused line disturbance, the overload was thrown on the equipment, and the wooden teeth would break and fly through the plant like cannon shot. The operator would have to dive behind the marble switchboard and await calm.²⁹

The cast-in-place concrete building consists of six bays, the two on each end one story and the four in the middle, two story. The end bays are not as wide as the four main bays. The roofs for both storys are pitched at approximately 6:12. They are also cast concrete, but were covered with a roll-type composition overlay at some time after construction to prevent leaking. The upstream face of the building shows shallow three-inch recessed and arched (segmental) panels in each bay on each story, with concrete pilasters dividing them. On the first floor, each bay contains a pair of double hung wood sash windows with four panes above and four below. The windows on the second floor are also double hung wood sash, but are larger and each case has six panes. All of the windows have slightly protruding sills. There is very little overhang of the roof; as a result, the top of the building shows a dark stain in the concrete above the arches.

²⁷ Heikes, p. 2.

²⁸ Owyhee Nugget, Nov. 22, 1907.

²⁹ Heikes, p. 3

On the right bank gable end of the building, there is a fixed recessed round window in the center, with its sixteen panes arranged on the diagonal, although the four panes in the center of the window are square in shape. Below the round window are six wood frame square openings, three on each side, through which electrical apparatus are extended. At the time the photographs were taken, four of these were blocked off and not in use. Continuing the theme of recessed arch panels between the pilasters are two such panels just above the roof of the one story bay and two more in the one story bay. The main entry to the powerhouse is through a rectangular opening in the one story bay, closed by means of a sliding door. On the downstream side is a window similar to the others on the first floor.

The downstream face of the building is similar to the upstream; however, the two center bays have their first floor section protruding from the building in a half gable. This area contains sump pump and other equipment. Window sizes and arrangement are similar to those of the upstream side. Below the first floor level, the pilasters continue as the foundation walls for the protruding section, and the areas below the floor are voids.

The left bank gable end was attached at the time of construction to the original powerhouse, and later to its replacement. The interior of the building is painted, although the second floor shows the bare concrete walls. Supporting the roof are three reinforced concrete trusses visible from the second floor. Each has five rounded openings blocked out, a large one in the center, a smaller one on each side, and a still smaller circular one at either end. The many windows provide for an interior space that is quite light, and permit breezes to blow through the building in the hot summer months.

In 1910 the Trade Dollar Consolidated Mining and Milling Company formed the Swan Falls Power Company to separate their growing power sales business from the mines. In order to expand once more the capacity of the dam, they went to the west side of the original powerhouse and excavated part of the lava island. Here they installed two 850 kilowatt 3-phase generators directly connected to Allis-Chalmers double runner, side discharge vertical turbines rated at 1030 horsepower at 17 feet of head. The generators remain as part of the present installation at the powerhouse, while the turbines and thrust bearings were replaced in 1945. With the increase in available power, the transmission lines were extended easterly all the way into Boise City from the Pierce Park amusement area.³⁰

The 1910 addition is two storys and divided into four bays,

³⁰ Heikes, p. 3.

the two on the west end (left bank end) being smaller, and the others housing the two generator-turbine units. The gable roof is a hard asbestos shingle and covers the wooden subroof. The pilasters between each bay extend up to the roof line without any recessed arch. Each bay has double hung sash windows on each floor. They differ from those in the 1907 section in that they all have fixed transom windows above them arranged with in two rows of four panes each. In the two wider bays, the double hung windows are triple banked, each with window with four panes above and four below. In the narrower bays, they are double banked. In the 1907 building, each window is separated by several feet of the concrete wall.

Underneath the first floor the arch design of the 1907 building is repeated in the upper openings to the scroll cases for the turbines. In front of these openings are iron trash racks.

At the left bank gable end there is another round window similar to the one in the earlier addition. Unlike the earlier one, this one can be covered with a set of rectangular metal shutters. On the second story there is one double banked set of windows on the upstream side which allow light into the operator's control room. On the first story are two double banked sets on either side of the rectangular entrance to the building.

On the downstream face of the powerhouse, the design of bays and windows is similar to that of the upstream face. Below the first floor is a basement level providing access to the turbines and other equipment from a wooden walkway supported by steel brackets. The recessed arch design is apparent in the concrete on this level. The first bay shows only two square window-like openings, while the second has a door and a square window opening on either side. The roof is pitched at approximately 6:12. It is supported by exposed steel trusses. Protruding from the roof at the center of the ridge is a ventilator.

Around 1910 the competition among small power companies in Southwest Idaho entered a high pitch. There had now been time for several small companies to establish power generating sources and extend their lines into competitors' territories. What with replacing direct current plants with alternating current, duplicating plant and lines, cutthroat price competition, a general confusion about how to price electricity, and the high cost of maintenance and new extensions, it was only a matter of time before consolidation or bankruptcy - or both - would

overtake the power industry of southern Idaho.³¹

The Swan Falls property, the largest single power generator in Southwest Idaho, in December of 1911 became part of a consolidation of the Swan Falls Power Company, the Caldwell Power Company, and the Dewey Electrical Light and Power Company. These three companies were all owned in various degrees by Colonel Dewey, his son Thomas, and J.S. and W.S. Kuhn, Pittsburgh investors who bought out the stock from all other interests in November of 1911. The Kuhns had also made other investments in Idaho irrigation developments in the Twin Falls area to the east. The name of the consolidated company was Southern Idaho Light, Heat, and Power, but it was soon renamed the Idaho Railway, Light, and Power Company (Idaho Railway Company) because the directors bought three Boise Valley electric railway companies and added them to their operations. The power and electrical railway industries of southwest Idaho were now joined.

The Idaho Railway Company proceeded to create a loop connecting Boise with Nampa and Caldwell. They had ambitions to extend the line to Emmett, but were unable to do so.³²

The demand for electricity for the railroad, home lighting, and other purposes continued to grow rapidly as the valley's irrigation projects continued to bring more settlers to the area. Needing to increase the capacity of Swan Falls again to serve this growing demand, the Company in 1913 removed the original powerhouse at Swan Falls between the 1907 and 1910 additions and built a reinforced concrete building connecting them. They removed the original equipment and replaced it with two vertical turbine-generator units, each rated at 1250 kilovolt amperes and driven by 1750 horsepower 21 foot head turbines made by I.P. Morse Company. There was room for two additional units which could be added in any future expansion.

The building continued the design features of the 1910 building rather than that of the 1907 section. It is higher, however, than the 1910 section (and the 1907 section as well). It is the understanding of the present engineers that the steel trusses supporting the gable roof of the original 1900 building were used again, but raised to the level of the second story. The original building was only one story. The slate roof of this

³¹ See Idaho Power Company's Idaho Power Company, A History of the Development of the Electric Industry in Southern Idaho and Eastern Oregon, 1887-1943, with reference to Idaho Power Company and its Predecessors (Boise, 1943). Hereafter, "IPC, A History."

³² "Boise Valley Traction Company, Description of Property of Boise and Interurban Railway Company," n.d. Idaho Power Company.

section may also be from the original building. A ventilator similar to the one on the 1910 section protrudes from the ridge line of the roof. This and the 1910 section both have an eave which overhangs the building by several inches.

The building has four bays each the same width. Each is recessed in the same manner as the panels described for the 1907 section, except that there is no segmental arch design, but merely a straight horizontal line between the pilasters. The window sills on the second story are at a slightly higher elevation than those of the 1910 section. Perhaps for this reason, there are no fixed transom windows on the second story. The windows are all arranged in the triple banked manner of the 1910 section, with fixed transom windows on the first story.

On the gable ends there is a round window like the others described, each with rectangular metal shutters. On the right bank end, there is a recessed panel and one triple bank of windows on each story.

On the downstream face of this section, the two central bays contain no windows but several small circular openings for lightening arresters and transmission line. Two small gables corresponding to the width of the bays offer extended roof protection to these openings. The two outer bays each have a triple bank of windows on each story in the same arrangement as on the upstream face of the building. At the basement level, the access to the lower shaft and other equipment is via a door to each bay. Square window openings are on either side of each door. The recessed panels are topped with the segmental arch design. Below this level can be seen the buttresses to the dam, which are five feet thick and spaced seventeen feet apart.

Inside the 1910 and 1913 sections, there is a concrete-floor balcony on the downstream side supported by steel I-beams. At the left bank end of the balcony is the control room with its panels of gauges and controls. Looking out above the generators towards the right bank end, one can see the rail guides for the motor operated crane.

On the upstream face of the powerhouse, access to the trash racks is on a metal walkway braced just above the level of the concrete dam which supports the powerhouse buildings. Outdoor lights are attached to each pilaster just above or at the level of the first story windows and supplied with electricity through a conduit which is at the same elevation on all three sections of the powerhouse.

Overall, the rectangular shapes of the three sections of the powerhouse with their pilasters and recessed panels give an impression of stability and permanence. Lacking an abundance of defining features, it would be difficult to say that these

buildings were built to represent a particular style. However, the gable roofs, the repetition of arches and recessed panels, combined with a reasonable effort at symmetry in window spacing and arrangement, give the buildings a classic feel.

By 1913 irrigators in the Gem and Wilson irrigation districts were interested and ready to use electricity to pump water to their fields. Idaho Railway extended 25 miles of 66,000 volt transmission line to serve them.³³ This was the beginning of a long series of extensions and hook-ups to irrigation projects. In the next 65 years, irrigation would form the basis of economic and community growth all along the Snake River, and electrical power for pumping and pressure sprinkling would gradually replace early gravity-flow methods of distributing water. Neither the power industry nor irrigated agriculture would have grown without the other.

Swan Falls, being the first hydroelectric dam on the Snake, exemplified a pattern of development repeated at other power plants on the Snake River. As demand grew, the capacity was increased in accordance with advances in technology and the ability to finance expansion.

In 1913 Idaho Railway placed flashboards on the spillway dam during the low water period, hoping to increase the head through the turbines. While doing this, the crews observed that there was considerable leakage through the structure due to the loss of rock from the cribs. As a result, the flashboards did not in fact increase the head.

To deal with this problem Idaho Railway in 1914 replaced 12,000 cubic yards of rock and gravel plus concrete in the cribs. This kind of work gradually became a routine part of the annual maintenance at the dam until major reconstructions in 1920 and 1936. In addition, they built two "by-pass gates" at the east end of the powerhouse to increase the spillway capacity and achieve better water control. The gated openings were each 12 1/2 feet high and 17 feet wide. It was now possible to reduce the water level in the reservoir for a complete inspection of the 1901 portion of the structure.

PART SIX

THE IDAHO POWER COMPANY ABSORBS SWAN FALLS

The Idaho Railroad, Light and Power Company eventually

³³ Heikes, p. 3.

succumbed to the frantic competition among all of the electrical companies in southern Idaho. Several different consolidations had been underway after 1907, as eastern capital syndicates bought out many of the small operating companies and extended transmission lines into territories already served by a competitor. Between 1910 and 1914, the miles of power lines in southern Idaho increased from 626 miles to 1510, for example.³⁴ By 1913 there were three competing interests in the Boise valley alone, each of which had bought service contracts at extremely low rates, sometimes without actually controlling or owning the source of generation intended to supply the power.

Unable to pay its bills, and financially linked to another company which had already gone into receivership earlier in 1913, the Idaho Railway Company went into receivership on December 23, 1913. The receiver sold the mortgaged Swan Falls dam and other property on June 21, 1915 to Electric Investment Company, this being a temporary holding company created for the purpose by Electric Bond and Share Company of New York.³⁵

Idaho Railroad was only one of several other companies to which the explosive competition had brought disaster. The debacle ended with the creation of the Idaho Power Company, made possible with the advice and capital of Electric Bond and Share of New York. The restructured single company consisted of five major companies that had been operating along the Snake from Pocatello in eastern Idaho to eastern Oregon. Together with several other hydroelectric generation plants, Swan Falls was now part of the new company's operations and remains so to this day.

Once the company began operating, one of its earliest and most urgent goals was to complete all interconnections among transmission lines and eliminate the maintenance on duplicate transmission and distribution facilities previously constructed by competitors. Swan Falls became part of a fully interconnected system in 1916 or 1917 when Idaho Power constructed a 44,000 volt line to connect to predecessor companies to the east, west, and north.³⁶

³⁴ IPC, A History, p. 23.

³⁵ "Order confirming sale, accepting payments on account, purchase price, and directing receiver to deliver property to receiver," Frank S. Dietrich, District Judge in "Guaranty Trust Co. of New York vs. Idaho Railroad, Light, and Power Co., Idaho Traction Co., E.H. Jennings, O.G.F. Markhus as receiver of Idaho Railroad, Light, and Power," in Equity #517. Copy in Book 1 of Swan Falls 503 Licensing Records, Legal Department, Idaho Power Company.

³⁶ Heikes, p. 4.

During World War I, the federal government discouraged the use of labor and materials on development not essential to the war effort. Unless requests for distribution extensions could pay for themselves with one year's revenues, Idaho Power refused to extend service to rural areas. There was already competition in southern Idaho between irrigation use of electricity and space heating, since during certain months there was not power for both. The Idaho Public Utilities Commission supported power for irrigation as the appropriate first priority.³⁷

At the end of World War 1 in 1918, Idaho Power was eager to increase its generating capability and proceed with aggressive marketing of electricity. The Company installed two more generating units at Swan Falls in the space prepared for them in the 1913 addition. They also removed the 1907 installations from the east powerhouse and replaced them with four 1000 kva, 2300 volt, 3-phase generators directly connected to Wellman-Seaver-Morgan vertical turbines. These were identical to the pair installed in 1913 except for a higher rating.

To summarize: There were now ten generating units inhabiting the Swan Falls powerhouse with a combined capacity of 8000 kilowatts. (Later improvements would upgrade this rating further.) Swan Falls was, at the time, the largest single plant in Idaho.³⁸ The powerhouse today consists of the components built in 1907, 1910, and 1913. It is 290 feet long with height varying from 78 to 91 feet.

The company decided that the annual replenishment of rock to the leaky dam had to come to an end. In 1919 they began to rebuild the old wooden spillway dam between the lava island and the left shore. This time it was possible to examine the deep crevice which had hindered the builders in 1900. The lava rock foundation was solid from the island to about 150 feet of the shore and then meandered toward the bank varying between 25 to 40 feet in depth.

The Company decided to replace the lava bed portion only and leave the wooden cribs over the crevice alone. This rebuilt portion was 300 feet long, 14 feet high, and set on solid rock against the downstream face of the old wooden dam. The upstream face was vertical with an "ogee" overflow line. The structure supported reinforced concrete piers two feet thick and provided 21 openings, each 12 feet wide. These were closed with taintor gates 8 feet high and operated with suitable hoists set on a

³⁷ Idaho Public Utility Commission, Annual Report of the Idaho Public Utility Commission, 1917-1918 (Fifth Annual Report) (Caldwell, Idaho: Caxton Press, 1918), p. 17, 64, 122.

³⁸ Heikes, p. 4.

concrete floor above.

Annual maintenance on the older section of the spillway had to continue in order to keep the leakage rate stable at about 600 to 800 cubic feet per second (cfs), about 10% of the average stream flow and a significant loss of power.

In 1936 the Company finally conquered the exasperating crevice. Instead of building the dam to the shore, the engineers decided to bring the shore to the dam. They brought fill out 154 feet to meet a new concrete abutment in mid-stream and joined to the 1919 concrete structure. The fill came from the rocky island and reduced its sixty foot height. They blasted away the rock and dumped it into an enclosure of permanent sheet steel piling which extended in large curves upstream from the present dam around to the shore line. The depletion of the rock promontory had an additional advantage of increasing the spillway capacity of the dam.³⁹

Ten additional spillway gates were added as well as two feet to the tops of all the spillway gates. The dam operator could now completely control the river during the flood season without endangering the power plant. With the new gates, the operating head for the turbines was now twenty-four feet.⁴⁰

The designer of the Swan Falls by-pass gates, the new gravity dam, the spillway and aprons of the old dam was Henry L. Senger, Idaho Power Company's Chief Engineer, who retired from the company in 1948.

By 1945 the old turbines installed in 1910 were suffering from fatigued steel and the Company decided to dispense with the constant maintenance. Their replacements had 1600 hp capacity and increased the output capacity of the plant by 850 kw during low water periods and by 1000 kw overall. The new turbines were made of non-corrosive alloys, had modern lubricating features, and dry-well inspection chambers.⁴¹

The Idaho Power Company continued to meet the demand for electricity for irrigation and industrial development up to, through, and after World War II with the expansion and construction of new dams along the Snake. When the C.J. Strike

³⁹ Idaho Power Company submitted a detailed inventory of plant equipment and other properties at Swan Falls as of July 31, 1925, to the Federal Power Commission. A copy is attached as Appendix C.

⁴⁰ Heikes, p. 4.

⁴¹ Bulletin (March 1945 and May, 1945), p. 1 respectively.

Dam was built about thirty-eight miles up from Swan Falls, Swan Falls now counted reregulating the peak flows from that dam as one of its functions.

Soon after the war, powerful new pumps began to lift irrigation water from the deep aquifer of the Snake River Plain to the north of the river, and another land rush was on, as thousands of new desert lands were developed for irrigation every year. In the Pocatello area, industrialists began to develop the phosphorus reserves and needed to build electrical furnaces. Idaho Power needed more power. During the 1950s, the Company won a difficult struggle for the licensing of three dams in the Hells Canyon reach of the river, downstream from Swan Falls - Oxbow, Brownlee, and Hells Canyon.

PART SEVEN

LICENSING, RELICENSING, AND THE GUFFEY PROJECT

Swan Falls Dam predated the Federal Power Act of 1920, which created the Federal Power Commission. The new federal agency had to license all existing hydroelectric plants on navigable streams and managed to license Swan Falls in 1928 for a period that would expire on June 30, 1970.

Since Swan Falls had been constructed by a predecessor company, the licensing process was not without its trauma, as the Company tried to collect the cost, equipment, and accounts data demanded by the FPC agents. The Company filed for its license in 1924 but there was a substantial delay while the company scrambled for the required inventories. The agency and the Company argued over the value of the plant and the exacting of fees for "back rental" of federal lands. In its telegraph communications with Electric Bond and Share representatives in New York, the Company used the cipher codeword "entangling" to refer to the Federal Power Commission, which might have described how they felt about becoming enmeshed in the regulatory net of the new federal agency.⁴²

As 1970 approached, the Company applied for renewal of the Swan Falls license. Because Swan Falls was one of the early dams the FPC licensed, the relicense was also one of the first. The

⁴² To W.R. Putnam from C.C. Boswell, Jan. 23, 1926, Western Union Telegram. Book 1, Project 503. All licensing correspondence comes from the License Books kept by the Legal Department of IPC, kept in chronological sequence.

Company had to consider a number of options in the relicense: whether to rebuild the aging dam completely, enlarge the reservoir, and increase its generation capacity, or whether to rebuild the dam and operate it in conjunction with a new dam about twelve miles downstream at a place known as the Guffey site, another way to increase generation and peaking power. At the same time, the Company had to consider the plans of one of its competitors, the Bureau of Reclamation, which was interested in building a high dam at the Guffey site as part of a proposed irrigation project. Under the Federal Power Act, the federal government could deny a new license to private power companies' plants and "recapture" them.

The Bureau of Reclamation's efforts to find a way to irrigate the Mountain Home Desert, east of Swan Falls, had over the years involved a variety of schemes. By 1959 the Bureau envisioned a dam at Guffey that would raise the water one hundred feet and generate power to be used for pumping it to 130,000 acres.⁴³ One of its impacts would be the inundation of Swan Falls.

In 1963 the Bureau of Reclamation filed for the right to divert water at the Guffey site for both power and irrigation. Various water users who would be affected by the proposal agitated for or against the project. In 1966 the Congressional delegation sponsored bills that would have authorized the Bureau's Guffey dam and several other elements of the Southwest Idaho Water Project.

Idaho Power Company objected strenuously to the idea that the federal government "recapture" Swan Falls and argued in Senate hearings, to the Federal Power Commission, and to Senator James McClure of Idaho that the Bonneville Power Administration could supply the needed power to the irrigation project, that such an arrangement would cost less than the Bureau's plan, and that the geological support for a high dam at the Guffey site was questionable.⁴⁴

In 1969 Idaho Power Company proposed to the Idaho Water Resources Board that the State and the Company engage in a joint venture to build and finance together an irrigation and power production project for the Mountain Home Desert. The Company

⁴³ Idaho State Reclamation Newsletter, April 9, 1959. Copy in Frank Church Collection at Boise State University, Series 7.9, Box 14, File "Guffey."

⁴⁴ To Federal Power Commission from Albert Carlson, April 1, 1968. Idaho Power Company Swan Falls Relicensing Book I, Legal Department.

felt that this project would be cheaper than the federal project, would irrigate more land than the federal project envisioned, and would increase generation at Swan Falls, increasing potential peaking power which the Company thought would be needed by the late 1970s.⁴⁵

This proposal began its way through the hearing process of the Idaho Water Resources Board and the Idaho State Legislature. In view of the uncertainty about which institution's plans or what combination of dams would be built, the Federal Power Commission relicensed Swan Falls to operate on a year-by-year basis until a determination could be made as to the best development plan for this part of the canyon.

Although the legislature approved the joint venture in 1971 its constitutionality was tested in court, and the issue was not resolved until 1976, when the Idaho Supreme Court declared the proposed joint venture was consistent with the state's constitution.⁴⁶

In the years between 1971 and 1976, conditions in southern Idaho and within Idaho Power Company had been rapidly changing. The Company had applied in 1974 for a permit to construct Pioneer, which would have been its first thermal plant inside Idaho, and found extremely heavy public opposition to it. As the hearings and public debate proceeded, they exposed the potential conflict between continued consumptive use of water for irrigation and the Company's use of water at dams to generate peak power during the irrigation season. In addition, the Department of the Interior had created the Birds of Prey Natural Area along an eighty-two mile stretch of the Snake River which included both the Swan Falls and Guffey sites. Along with this designation came the certainty that environmental and raptor-protection interests would become active in preventing any deleterious impacts on the birds of prey that might come from significant changes at Swan Falls. The costs to Idaho Power Company of the contemplated new high dam at Swan Falls had therefore gone up in several ways.⁴⁷

The Company's attention was taken up by the issues unleashed by the Pioneer proposal, and it paused in its pursuit of a joint venture with the state of Idaho. Meanwhile at Swan Falls, a series of engineering evaluations made during the 1960s and 1970s eventually concluded that the decaying dam was in more and more

⁴⁵ Current, December 1969.

⁴⁶ See Session Laws, Chap. 265, and as amended by Chap. 270, and IWRB vs. Kramer (548 p. 35, 1976).

⁴⁷ Bulletin, April 1976.

urgent need of serious rehabilitation and repair. The Company had run out of time and no longer could defer a decision on what to do with Swan Falls.

In 1979 the Company applied to the Federal Energy Regulatory Commission (formerly the Federal Power Commission) for its license and sought merely to continue operating the dam at its existing capacity. Then in 1981, the Company amended its application again to request an increase in the generation capacity at the dam. This would involve removing all ten of the operating units at Swan Falls, building a new powerhouse on the right bank, displacing some of the shop buildings nearest the existing powerhouse, and installing two bulb turbines, each of which would have a generating capacity of 12.5 megawatts.⁴⁸ The reservoir behind the dam would continue at the same size.

The growth projections upon which this increased need was based, however, had come from the period of the late 1970s, a period of boom and rapid growth in Idaho. By the time the paper work of 1980 and 1981 was in the pipeline, a national recession was on and conditions had drastically changed for the worse in the southern Idaho region. Growth had stopped, farms were in trouble, and the region's economy experienced the recession severely. Although FERC authorized the license request, Idaho Power asked that the Swan Falls expansion be postponed.

Some maintenance could not be postponed any longer, and the Company undertook to improve the road down to the plant in 1983 and to replace the spillway in 1986. FERC granted Idaho Power Company in 1987 a continuance until whatever time it would wish to proceed to install a new powerhouse and turbines.

The construction work required the removal of two cottages and other minor structures in its path. The spillway construction contractor, Morrison-Knudsen Company, extended a fill construction site into the river on the downstream side of the old concrete dam, from which vantage point several of the 1984 photographs for this study were taken. The new spillway consists of twelve concrete bays, each of which houses a steel radial gate, and is 31 feet wide by 15.5 feet high. The crest is at elevation 2300 feet.

During the road construction, the Company initiated a study of the impact of construction upon the behavior of the raptors in the canyon. After over 9000 hours of observation, its biologists found that the most significant potential impact on breeding

⁴⁸ For a summary of the license applications and amendments, see Idaho Power Company, Second Amended Application for New License: Project No. 503, Swan Falls Hydroelectric Project, October, 1981, p. 1-5.

behavior of the birds would be related to the availability or abundance of the prey base. Construction activities at Swan Falls, which included road construction and rebuilding of the spillway, had no impacts on the prey base. The study also found that construction-related explosive charges detonated near nests had negligible impact on the birds' behavior.⁴⁹

In 1989 the Company finally felt that increasing the generation capability at Swan Falls was justified by load forecasts. Additionally, continuing decay of the understructure at the old powerhouse dictated action. FERC granted the necessary approval in 1990, and the Company plans to proceed with construction in 1991.

The new work will result in the removal of the public restroom, the "blacksmith shop" (the name still used to refer to the machine shop), a garage, and the carpenter shop, storage sheds, and the A-frame gantry. For this reason, photographs of these buildings are included as part of this report. A site plan which includes construction and retirement dates for each of the buildings at the village site is included in this report as Appendix E. Idaho Power Company plans to retain the other buildings not in the way of new construction.

The blacksmith shop is a wood frame building, shotgun in form, with a gable roof and board and batten siding constructed in 1910. The double door entry is on east gable end and also made of wood. Above the entry is a double hung wood sash window with six over six panes. An identical window is next to the door on its left side. The building is on a slope with the higher ground on the north side of the building. The south face of the building reveals a lava rock foundation well over three feet high. This face has five double hung wood sash windows of the same design as those in the front. Inside the shop are a forge, lathe, storage areas, bins, and other equipment. The floor is of concrete.

On the west, or rear of the shop an annex has been attached. This is on a poured concrete foundation and is also of board and batten construction with a gable corrugated metal roof. On the west wall is a window with six panes. The south face has no windows. Passage between the annex and the main shop is via a door which opens into the main shop. The floor level of the annex is about three feet higher than the floor level of the main

⁴⁹ Holthuijzen, A.M.A. Behavior and Productivity of Nesting Prairie Falcons in Relation to Construction Activities at Swan Falls Dam. (Boise: Idaho Power Company, Bureau of Land Management, Pacific Gas and Electric Company, 1989). See Idaho Power Company, Application for License, April 1989, p. E-3 - E-4 for a summary of the study results.

shop. The annex contains shelves, storage bins, and racks.

The restroom is built of concrete blocks and has a flat shed-type roof with substantial overhang. It is divided into a men's and women's section.

The wood shop and storage building complex consists of three adjacent rectangular front-gabled wood frame buildings of identical size and of board and batten construction. They were built in 1913. Entry is on the south side. Between the buildings are two additional storage sheds (labeled A and B in the Photograph Index) which connect to the walls of the three buildings on either side of them and also open to the south side. These have flat corrugated metal roofs. The three main buildings each have a door on the north side (rear). The material storage building is on the eastern end of the complex. It has a batten and board rectangular door and one fixed window with four panes on the north side. The building sits on a concrete foundation. The interior contains wood bins and storage shelving. Next to it is storage shed A, used to store boards and planks.

The middle of the three buildings is the wood shop. Tool storage is on the walls, and work benches, saws, and other equipment are installed. Between this building and the carpenter shop to the west is storage shed B.

The carpenter shop is the building on the western end of the complex. The double front door on the east side is hinged to open to the outside. Above it is a transom blocked with wood rather than glass. Inside is storage shelving for paint and other chemicals used to treat wood.

The garage is a wood frame rectangular building with four vehicle bays, constructed of tongue in groove horizontal wood siding. Each vehicle bay opens on the east side with a garage door that slides to the top. The door on the south end is about a foot higher than the others. The shed-type roof slopes slightly toward the rear or west side of the building. A window opening exists at the rear of each bay, but is blocked off with wood.

The A-frame gantry is constructed of wood timbers and braces with the hoist frame at the top being steel I-beams. The wheeled hoist sits on rails and can be moved electrically forward and backward, while the chain can be raised and lowered. The north timbers butt up against storage shed B.

The house, built in 1943 and removed in 1984, appears to be a fairly simple folk type house, although decorative braces under the gables suggest the Craftsman style. It is a one-story side-gabled wood frame structure with a daylight basement. The horizontal wood lap siding is painted white. The front door to

the house is on the west side and is approached by four concrete steps and a small concrete stoop. A pair of metal hand railings are affixed in the concrete to the steps. Above the stoop is a cross-gable canopy, supported by braces against the wall. On each side of the front door is a double bank of double hung wood sash windows each with six panes above and six below. Below these windows is a basement window (probably the sliding type) each protected by a concrete window well.

The south end has a single double hung wood sash window similar in size and type to the ones in the front. Below it is a daylight window to the basement. The rear of the house has a back door, approached by only one step, and also with a gable canopy similar to the one in front. The east side has a cross-gabled projection from the main mass of the house. The end has a triple bank of windows, while there is one window on the side. This and all the other buildings described appear to have been built with attention mainly to its function and convenience and without embellishment.

Monthly reports written by the dam supervisor in the early 1950s give evidence that at that time, at least, construction and maintenance of all buildings in the village was a responsibility of the employees living on the site. This would seem to be true of earlier years as well. The crew's main function and training was to operate the dam and powerhouse - which might explain the functional directness of the various structures on the site.⁵⁰

PART EIGHT

SWAN FALLS AND THE FUTURE: THE SUBORDINATION ISSUE

From the perspective of the next century, the historical significance of Swan Falls probably will not focus on its role as the first hydroelectric dam on the Snake River, or the fact that it made possible one of the brightest eras of gold mining in the state's history, or powered the region's electric trolleys. Instead, Swan Falls will be known as the dam that precipitated the "Subordination Issue" and signified the end of one era in the history of Idaho and the beginning of another.

In 1900 Swan Falls was the first Snake River dam; the great irrigation projects that would make the Snake Plain "blossom as

⁵⁰ See "Monthly Reports," written by various supervisors. Located in annual files in the office of the operator at Swan Falls Dam control room.

the rose" had not gotten underway; it appeared to everyone that the Snake River was so generous that there would always be enough water for all who wanted to use it. When the state authorities approved Swan Falls and its water rights, they did not append any condition on those rights that would subordinate them to the future claims of irrigators who would arrive decades hence and consume the water on their farms. At that time they had neither the reason nor insight to do so.

By 1920 - or even earlier - Idaho policy makers and citizens held the unquestioned assumption that the future prosperity and growth of southern Idaho would come about by a continual expansion in the number of acres brought under the ditch. Water, whether diverted, pumped, or dammed, would be put to use for irrigation, and irrigation would always have a priority higher than power generation. Later hydroelectric projects were typically approved with the condition that upstream farmers, even though they should divert water "later in time" than the power dams, would have a superior claim to the water.

However, the irrigation expansion itself depended upon the use of power to pump water from reservoirs to lands higher than gravity systems alone could supply. The technology of pumps evolved so that soon after World War II, farmers could lift water several hundred feet directly from the Snake River Plain Aquifer. Farmers and scientists in Idaho had worked together for decades to discover when and how to deliver optimum amounts of water to crops at precise periods in their growing season. These ways usually involved the use of pressure irrigation systems that rapidly replaced the old methods of gravity flow, even in areas where topography made gravity flow possible. Electricity was essential for all of this, and in Idaho the electricity was generated by the very water that state policy was subordinating to yet more irrigation.

Like two parallel lines that seem to merge at a point on the horizon, the parallel histories of hydroelectric and irrigation expansion came to a point in 1982, when the Supreme Court of Idaho ruled that the water rights (to 8400 cubic feet per second) held by Idaho Power Company at Swan Falls had never been subordinated to the rights of future upstream irrigators and that if they were to be taken, just compensation should be paid.

The matter of subordination had erupted with the public protest against the construction of the Company's proposed Pioneer coal-fired power plant. The costs of the plant would result in significant rate increases, and protests to the proposal emerged in considerable strength from the urbanized southwestern area of Idaho, where the plant would be located. In 1977 a group of thirty-two ratepayers filed a complaint with the Public Utilities Commission and argued that Idaho Power Company, by permitting new irrigation pump hookups, had not been

protecting its water rights at Swan Falls and that it was liable to the ratepayers for failing to do so.⁵¹

The Company was in a strange and uncomfortable position. It had always supported the expansion of the irrigation\electricity partnership, and had always been willing and ready to supply new power and peaking power for summer season pumping. It always had accepted the subordination clauses placed in its state permits and federal licenses. It had always assumed that the subordination policy applied at Swan Falls also. Now, the complaint forced the Company to request the Public Utilities Commission to declare that its water rights were NOT subordinated at Swan Falls. It also forced the Company to sue the owners of 200,000 acres of irrigated land upstream from Swan Falls to stop them from diverting water.

Once the Supreme Court made its 1982 decision (which was a reversal of the lower District Court's decision), the stage was set for the legislature to consider a change in the basic water laws of the state. One bill proposed that all hydroelectric generation be subordinated to irrigation. It failed. Another proposed to protect the power company from ratepayer lawsuits claiming it had failed to protect its water rights and from any penalties that might be levied against the Company by the PUC. This one passed, and the Company dropped its own suit against most of the owners of the 200,000 acres. The Company, with the endorsement of the PUC, had placed a moratorium on new hookups for irrigation pumping.⁵²

The complicated problem eventually resulted in the "Swan Falls Agreement," a term which embraces several ratifying actions by various institutions. The Legislature in 1983 and 1984 had been reluctant to set a precedent in declaring any party's court-determined water rights subordinated, but there was no certainty that the balance would not shift. In the summer of 1984 the power company sought - and achieved - a negotiated settlement that would postpone the need to change any laws and protect all parties from lawsuits and claims.

The Agreement was a contract and compromise between the Governor, the Attorney General, and the Power Company, some of the features of which were:

- Idaho Power would not insist via lawsuits on its rights to 8400 cfs at Swan Falls Dam, but accept a guaranteed flow of 3900 cfs in the summer and 5600 cfs in the winter.

⁵¹ Public Utilities Commission, Case U-1006-124, June 15, 1977.

⁵² Bulletin, "Water Rights: Complex Issue Not Resolved Yet." Spring 1983, p. 6

- The State agreed that in studying any new requests for irrigation projects it would evaluate their impact on hydroelectric generation downstream.
- Idaho Power would drop its suit against upstream irrigators.
- Idaho Power water rights would be placed in trust by the State for the near term.
- Idaho Power, the State of Idaho, and federal wildlife agencies would collaborate on a series of studies to evaluate the impact of minimum flows below Swan Falls on fish and wildlife.
- Idaho's Congressional delegation sponsored a bill that would require FERC to accept the agreement in its licensing and other activities on the Snake. This bill was signed by President Reagan in 1987.⁵³
- The state would initiate an adjudication process in which all the claims for water in the entire Snake River basin would be registered and placed in an orderly relationship to one another. The outcome would not be known for at least ten years, late in the 1990s, and the outcome would, it was hoped, identify just how much water really was available for additional irrigation development in the Snake River Plain of Idaho.

While the Swan Falls Agreement is not a final resolution of the conflicts it addressed, it represents the historical divide between the era of unquestioned superiority of the irrigation claims to water in southern Idaho and a new order in the ranking of priorities for Snake River water.

⁵³ For a brief summary of the Swan Falls issue and the events leading up to the Agreement, see Randy Stapilus, Paradox Politics, p. 297-304. See also Scott W. Reed, "The Other Uses for Water," Idaho Yesterdays 30 (Spring-Summer 1986), p. 33-44; Ray W. Rigby, "Water Rights: How We Got Them, How We Adjudicate Them," Idaho Yesterdays, same issue as Reed.

APPENDIX A

LIFE AT SWAN FALLS VILLAGE

Because of its location deep in the canyon, at a significant distance from commercial or residential centers, and access only by (still) rough dirt roads, Swan Falls had to become an independent and self-reliant center of operations. The small cluster of buildings on the east side of the dam was a center of life and activity for the crews that lived there summer and winter. By 1925, the Company's inventory listed cottages, a machine shop, wash and ice pump houses, a barn, a construction office, cellars and storehouses, and bunkhouses. See Appendix C for detailed descriptions of these and other structures at the site. Later a school building was added. There was also the ferry, orchards, installations for cranes, and the roads. Of these buildings, the residence cottages, bunkhouse, shops, school, and storehouses still remain. A small orchard was planted in the early 1950s between the dam and the residence cottages. The ferry, barn, and other structures for the housing of pigs and other large farm animals are gone.

Until the mid-1930s the crew was mostly young single men, fresh graduates of engineering schools with career ambitions in the electrical power industry. The company sent them to Swan Falls for their first hands-on experience with the "cosmopolitan assembly of equipment," at the site.⁵⁴

The crew quarters was a three-story building known as the "club house." Its cook automatically acquired the title "King" or "Queen." One of the comforts of the club house was a homemade water heater invented before the outside world invented water heaters: when the tub was filled with cold water, the bather lowered a 440 volt set of coils into the water, which heated it up quite rapidly. The bather had to take great care not to test the water until the coils had been removed from the water.

During the days when there were still miners at Silver City - and still an abundance of sturgeon in the river - crew members would moonlight as sturgeon fishermen and sell their catches to the Silver City boarding houses or Boise markets.

In 1907 when construction required a road connection from the Owyhee County side to the railhead twelve miles away at

⁵⁴ Henry L. Senger, "The Swan Falls Power Plant," Bulletin (August 1936), p. 1.

Murphy, a ferry operated more or less regularly. It brought mail, supplies, passengers, and equipment across the reservoir to the village. Motive power came from electric motors operating side paddle wheels. An overhead cable supplied the power to the motors. The remains of the ferry landings and cable frame can still be seen about a half mile upstream from the dam.

The company hired a driver for the "candy wagon" to make the daily two and a half hour trip between Swan Falls and Murphy at least once a day for the mail and supplies. For special loads, there had to be a special team, such as the time twenty-two horses hauled a new generator from Murphy.

One of the favorite stories about the rugged and often dangerous working conditions at Swan Falls concerns two men who later rose to become company president and vice-president. During a cold winter day trash had accumulated at the trash racks, interfering with the water reaching the turbines. Among the debris was the carcass of a cow, awkward, heavy, and unmanageable. The two men could not maneuver the cow with their rakes and poles. As a desperate solution, they lifted the gate to the turbine and allowed the cow to pass into it. "As they crossed their fingers and held their breath, there was a huge shudder and clunk, after which the tailrace and the river from bank to bank were spread with freshly-ground 'cowburger.' The dead cow had been disposed of."⁵⁵

Until 1927, when American Falls Dam went on-line upstream, clearing the trash racks was a more significant part of the work at Swan Falls than it was afterward. The crew had to contend with trees, tree stumps, sagebrush, logs, willows, and animal carcasses. All removal was done by man power. On the other hand, American Falls and other upstream dams also eliminated the flushing action of spring floods. Subsurface weeds and perennial grasses - "moss" - began to grow in the Swan Falls reservoir. This became a new kind of trash. At times the removal of loose "floating islands" from the trash racks required the shutting down of the plant (at night) and the attention of all nineteen crew members to remove it and dump it into the tailrace. The trash problem inspired more than one trash rack design that was calculated to "finally" solve the trash problem. There is still trash today, but it passes through larger openings to the turbines and is discharged into the tailrace.⁵⁶

During severe winters ice would accumulate in the reservoir and against the dam and trash racks and have to be cleared or

⁵⁵ Young and Cochrane, p. 25.

⁵⁶ Henry L. Senger, "The Swan Falls Power Plant," Bulletin (August 1936), p. 1.

blasted away, a risky exercise. The cold would also freeze the taintor gates shut, and the crew invented procedures to allow reservoir water to flow over the spillway and thaw them out.

Henry Senger recalled the way the dam and powerhouse, with its windows and lights on at night gave the plant the appearance of a ship afloat on a bay. The ten units operating together produced a "gigantic chord as if from a monstrous organ." When the crew noticed a discord, it was a sign of trouble.

The road down the canyon walls was a challenge for most kinds of vehicles. Among the duties of the crew members was the rescue and towing of cars, particularly Fords in the early 1920s, and trucks that could not make it back up the rocky incline. The area was always a popular place for fishing outings and picnics, so there was always company during the warmer seasons of the year.

After 1950 crew duties continued to include all the housekeeping required of a small community in addition to the running and repair of the old powerhouse. The crew remodeled the old "cottages," built new ones, planted and tended the fruit orchard, weeded the grounds, and tried (mostly in vein) to keep the old ferry afloat. The kept the sewer system working and tested the water supply for purity. There were always new piles of rock that had fallen from the canyon wall onto the grade, and delicate negotiations with the Ada County highway authorities about the condition of the road to Kuna. On weekends there were visitors - all kinds. In July 1970 the superintendent wrote that "three of the long-haired gentlemen the employees at Swan Falls were advised to treat well were caught stealing brass pipe from the pipe rack about 11 pm."⁵⁷

The isolation of the place and the common way of life at the village always generated a family feeling among the people who worked there, a feeling which still exists.⁵⁸ Currently there is a ten-person crew at Swan Falls, and after the 1991 changes, there will only be five. With the increasing interest in the birds of prey, a growing appreciation of historical sites in Idaho, and the improvement in the access road to the dam, and a brand new powerhouse with only two turbines, there will undoubtedly be less isolation and a different emphasis in the kind of work done at Swan Falls.

⁵⁷ Activities and events at Swan Falls were reported in monthly reports, copies of which are filed in the office at the power plant at Swan Falls.

⁵⁸ Interview with Randy Hill, assistant supervisor at Swan Falls, by Susan M. Stacy, October 12, 1990.

APPENDIX B

FISH LADDER

From its earliest days there was some sort of fish ladder at Swan Falls. However, there is little evidence that any fish ladder of any design ever worked very well or was kept in use very long. The science of fish ladders seemed completely inadequate for the needs of fish, and even when the engineers were willing to accommodate the fish, the experts they looked to were unable to help them very much.

A. J. Wiley installed the "the best ladder that the U.S. Fish Commission recommended." According to his notes on the specifications to the dam, it was known as the Coil System. It would be located on the island at the right hand end of the crib dam with its upper end passing through the concrete abutment on a level with the crest of the cribwork. The lower end would extend below low water below the dam. It consisted of a flume or chute of solid construction built on a 4 to 1 slope and divided by transverse partitions into a series of pockets. Each partition had in one end at the bottom of the flume an orifice of twelve inches square. Water was to flow above the dam and over the partitions and through the orifices. Fish were to leap over the partitions or dart through the orifices, with the pockets forming resting places.⁵⁹

In September of 1903, the Idaho State Fish and Game Warden W.V. Iorns visited the fish ladder at Swan Falls and complained to the Trade Dollar manager that it was not operating "so that salmon can go up it scarcely at all and I told Mr. Lee how it should be fixed...See that it is done within the next ten days." However, a couple of weeks later, Iorns wrote "it is now too late to do the salmon any good...from what I can find out they won't take a ladder like a trout will." He observed that the ladder did not seem well situated, but "you know that one has to know the habits of different fish to fix a thing of that kind in the proper place."⁶⁰

In September 1922 a concrete fish ladder was installed at a cost of \$4495.02 next to the by-pass gates. It had eleven pools each six feet by six and a half feet with the water in each two

⁵⁹ Wiley, "Specifications."

⁶⁰ To Frederick Erwin from W. V. Iorns, Sept. 30, 1903, and October 12, 1903. IHS, MS 69, Trade Dollar papers, Box 5, File 1903 I-L.

feet deep. The drop between each was two feet.⁶¹ This fish ladder is still in place, but present operators do not recall it ever being in use.

⁶¹ Electrikat, September 1922.

SOURCE:

IDAHO POWER COMPANY
LEGAL DEPARTMENT
LICENSE BOOK 1
PROJECT 603, SWAN FALLS

EXHIBIT "R"

Referring to Regulation 6 - Section 5
Federal Power Commission

IDAHO POWER COMPANY

Inventory of Swan Falls Hydro-electric Power Plant
As of July 31st, 1925.

This Exhibit contains original cost of the project works made up as actual original cost where actual cost was available (tabular caption "actual"), and estimated original cost where actual cost is not available (tabular caption "estimated"), together with the original cost of additions made between the 31st day of December, 1919, and the 31st day of July, 1925.

This Exhibit is submitted in response to the regulations of the Federal Power Commission and in the form required by such regulations, but is not the applicant's claim of "Net Investment" or "Fair Value" of the project works, and is without prejudice to such claim of "Fair Value" for purpose of establishing "Net Investment" as the applicant may make and support in proceedings under Section 23 of the Federal Water Power Act.

No actual or estimated statement of intangible capital costs (non-physical capital value) Form 11-49 as applied to this plant is available and therefore such values are not included. By this omission of intangible capital costs the applicant does not surrender its claim of "Fair Value" in subsequent determination of "Fair Value" or "Net Investment" of the project works.

This statement is a part of the application for license made by the undersigned under date of the 26th day of Jan., 1924.

IDAHO POWER COMPANY

By (Sgd.) W. R. Putnam
Vice Pres.

Attest:

(Sgd.) A. J. Priest
Secretary.

TRANSFERRING
ELECTRIC

IDAHO POWER COMPANY

EXHIBIT "R" OF
APPLICATION FOR LICENSE NO. 503
(Act of June 10, 1920, 41 Stat. 1063)

SWAN FALLS HYDRO-ELECTRIC PLANT
SHAKE RIVER, IDAHO

IDAHO POWER COMPANY
INVENTORY OF SWAN FALLS HYDRAULIC POWER PLANT
AS OF JULY 31, 1925

GENERAL SUMMARY

ACCT. NO.	ACCOUNT	HISTORICAL COST		
		ACTUAL	ESTIMATED	TOTAL
		\$	\$	\$
312 -	Hydraulic Power Plant Land	1,894	3,687	5,581
313 -	Hydraulic Power Plant Structures	32,803	125,889	158,692
314 -	Reservoirs, Dams & Intakes	181,304	424,582	605,886
317 -	Forebays, Penstocks & Tailraces	8,506	4,124	12,630
318 -	Production Roads and Trails	4,350	14,866	19,216
319 -	Water Turbines & Water Wheels	233,254	99,930	333,184
320 -	Electric Equipment - Hydro	181,097	104,081	285,178
322 -	Other Power House Equipment- Hydro	3,772	6,789	10,561
323 -	Misc. Power Plant Equipment- Hydro	2,647	9,816	12,463
332 -	Transmission Structures	390	-	390
333 -	Transmission Substation Equipment	37,045	46,263	83,308
390 -	Engineering & Supt. During Constr.	<u>5,379</u>	<u>-</u>	<u>5,379</u>
	Total Cost	\$692,441	\$840,027	\$1,532,468

Name of Applicant Idaho Power Company

Statement of Inventory and Original or Historical Cost as of July 31, 1925.
of
PROJECT LANDS AND RIGHTS OF WAY

Account No. 312, Title Hydraulic Power Plant Land

1. General Description:

Parcel complete as follows:

Lot 6 of Sec. 18, T. 23., R. 1 E.B.M.
Lot 11 " " " " " "
Lots 1, 8, 9 & 16, Sec. 19, T. 23., R. 1 E.B.M.
Lots 1, 8, 9 & 16 Sec. 30, " " " "
Lots 1, 8, 9 & 16 of Sec. 31, " " " "

2. From Whom Acquired United States
3. Deed U.S. Patent Date April 1, 1902 Recorded in Book 2 of Patents
at page 552, Records of Ada County, State of Idaho
4. Term of Title or Right Acquired Perpetual
5. Date Right of Use Expires, if Other Than Perpetual -
6. Purpose for which Used Reservoir Site, Dam, Project Structures and Tailrace
7. Map on which Location of Land or R/W is Indicated Ex. J - General Map
8. Area 437.0 acres

ITEMS OF COST	AMOUNT	
	ACTUAL	ESTIMATED TOTAL
9. Amount paid for land or right of way	\$ 2,185	\$ 2,185
Overhead Costs		
10. Engineering and Supt. (A/c 390)		
11. Law Expenditures (A/c 391)		
12. Injuries and Damages (A/c 392)		567 567
13. Taxes (A/c 393)		
14. Interest (A/c 394)		
15. Misc. Expenditures (A/c 395)		
16. Total Cost	\$2,752	\$2,752

Name of Applicant Idaho Power Company

Statement of Inventory and Original or Historical Cost as of July 31, 1925.
of
PROJECT LANDS AND RIGHTS OF WAY

Account No. 312, Title Hydraulic Power Plant Land

1. General Description:

Parcel complete as follows:

Lot 10 of Sec. 18, T. 2 S., R. 1 E.B.M.
Lots 2, 7 & 10 of Sec. 19, T. 2 S., R. 1 E.B.M.

2. From whom Acquired United States
3. Deed U.S. Patent Dated April 1, 1904 Recorded in Book 6 of Patents
at page 99, Records of Owyhee County, State of Idaho
4. Term of Title or Right Acquired Perpetual
5. Date Right of Use Expires, if other than Perpetual -
6. Purpose for which Used Reservoir Site, Dam, Project Structures & Tailrace
7. Map on which Location of Land or R/W is Indicated; Ex. J - General Map
8. Area: 146.7 acres

ITEMS OF COST	AMOUNT		
	ACTUAL	ESTIMATED	TOTAL
9. Amount paid for land or right of way	\$ 734	\$	734
<u>Overhead Costs</u>			
10. Engineering and Supt. (A/c 390))		
11. Law Expenditures (A/c 391))		
12. Injuries and Damages (A/c 392))	191	191
13. Taxes (A/c 393))		
14. Interest (A/c 394))		
15. Misc. Expenditures (A/c 395))		
16. Total Cost		\$925	\$925

Name of Applicant Idaho Power Company

Statement of Inventory and Original or Historical Cost as of July 31, 1925.
of
PROJECT LANDS AND RIGHTS OF WAY

Account No. 312, Title Hydraulic Power Plant Land

1. General Description: Water Rights.

For complete statement of the nature, extent and ownership of Water Rights see Exhibit E of Application for License.

ITEMS OF COST	AMOUNT		
	ACTUAL	ESTIMATED	TOTAL
2. Amount paid for land or right of way	\$1,894	\$ 10	\$1,904
<u>Overhead Costs</u>			
3. Engineering and Supt. (A/c 390)			
4. Law Expenditures (A/c 391)			
5. Injuries and Damages (A/c 392)			
6. Taxes (A/c 393)			
7. Interest (A/c 394)			
8. Miscellaneous Expenditures (A/c 395)			
9. Total Cost	\$1,894	\$10	\$1,904

Name of Applicant Idaho Power CompanyStatement of Inventory and Original or Historical Cost as of July 31, 1925.
ofPROJECT STRUCTURES LOCATED ON PROJECT AREAAccount No. 513 , Title Hydraulic Power Plant StructuresItemsPower Plant Building

1. General Description of Structure: In three sections, called "East", "Middle" and "West." Dam forms foundation throughout. Superstructures all of concrete and steel. (a) East section: Length 125' 0"; width 34' 0"; height from generator room floor to transformer room floor 20' 0"; height from generator room floor to eaves 37' 0"; height to peak of roof 46' 0". (b) Middle section: Length 92' 6"; width 49' 0"; height to eaves 38' 0"; height to peak 51' 0". (c) West section: Length 73' 6"; width 49' 0"; height to eaves 32' 0"; height to peak 45' 0". (d) 60" cone ventilators, one in middle section and one in west section of power house. (e) Station lighting system consisting of one Westinghouse 10 kva transformer 2200-1980/220-110 v, type H, Form G, together with wire conduit, lamps, brackets, sockets, fuses, globes, etc., necessary to lighting system.
2. Location of Structure with Reference to Project Area On Plant Substructure Dam.
- Reference to map on which the structure or the project area therefor is shown: Exhibit J, K & L
3. State whether on Owned, Leased, or Government Land Owned
4. Year Built 1 (a) in 1906-07; 1 (b) in 1912-13; 1 (c) in 1910; 1 (d) in 1922

ITEMS OF COST	AMOUNT	
	ACTUAL	ESTIMATED TOTAL
5. East Section		
Direct Costs:		
(a) Power House Structure	\$ 2,099	\$16,276 \$18,375
(b) Whiting 10-ton hand operated crane	790	790
Freight, hauling and labor		450 450
Indirect Costs:		
(c) On (a) above		4,594 4,594
(d) On (b) above		310 310
6. Middle Section		
Direct Costs:		
(a) Power House Structure	13,888	16,922 30,810
(b) "Case" 25-10 motor operated crane	2,984	2,984
Hauling and labor		228 228

6. Middle Section Cont'd:

SWAN FALLS DAM
HAER No. ID-20
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ITEMS OF COST	AMOUNT		
	ACTUAL	ESTIMATED	TOTAL
Indirect Costs:			
(c) On (a) above		\$ 7,702	\$ 7,702
(d) On (b) above		803	803
7. <u>West Section:</u>			
Direct Costs:			
(a) Power house structure	\$ 490	12,720	13,210
(b) "Cleveland" 12-ton crane, hand operated	710		710
Freight, hauling and labor		517	517
Indirect Costs:			
(c) On (a) above		3,303	3,303
(d) On (b) above		307	307
8. <u>Two, 60-inch Ventilators in Middle and West Sections of Power House</u>			
Direct Costs:			
(a) Material	1,128		1,128
(b) Hauling and labor	404		404
Indirect Costs (c)	46		46
9. <u>Station Lighting:</u>			
Direct Costs:			
(a) Material	726	404	1,130
(b) Labor and hauling		315	315
Indirect Costs (c)		361	361
<u>Overhead Costs</u>			
10. Engineering and Supt.	(A/c 390)		
11. Law Expenditures	(A/c 391)		
12. Injuries and Damages	(A/c 392)		
13. Taxes	(A/c 393)		
14. Interest	(A/c 394)		
15. Miscellaneous Expenditures	(A/c 395)		
16. Total Cost	\$23,291	\$81,540	\$104,831

SWAN FALLS DAM

HAER No. ID-20

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Name of Applicant Idaho Power CompanyStatement of Inventory and Original or Historical Cost as of July 31, 1925.

of

PROJECT STRUCTURES LOCATED ON PROJECT AREAAccount No. 313 , Title Hydraulic Power Plant StructuresItemsIncidental Buildings

1. General Description of Structure:

- (a) Upper Operator's Cottage: Eight-room frame bungalow; 12" concrete foundation; walls 6" drop siding; shingle roof; screened porch around 3 sides; length 38'0"; width 24'3"; height to eaves 7'6"; height to ridge 18'0"; built 1910; estimated cost below includes furnishings.
- (b) Boarding house: 2-story frame structure; eight rooms; 12" concrete foundations; 66" drop siding; shingle roof; length 40'0"; width 28'0"; height to eaves 20'0"; height to ridge 36'6"; built 1900-01; estimated cost below includes furnishings and equipment.
- (c) 27 frame structures, used for various purposes, built 1900-19, viz:
- (1) "Down River" operator's cottage, 5-room frame structure, 1"x12" siding; rubberoid roofing; length 40'0"; width 12'0"; height to eaves 11'0"; estimated cost \$1162.;
 - (2) cellar at Chief Operator's cottage, dug in hillside; lined with 2"x12" lumber; covered with earth; length 9'6"; width 6'0"; height to eaves 6'6"; estimated cost \$61.;
 - (3) cellar at Boarding House; length 16'6"; width 14'0"; height 7'3"; framing timbers 6"x6"; lining 2"x12"; earth covered roof; estimated cost \$163.;
 - (4) concrete cellar; length 16'0"; width 14'0"; height 6'3"; estimated cost \$492.;
 - (5) cellar at Upper Operator's Cottage; 1" sheathing on 2"x4" frame; door at one end; earth covered roof; length 10'6"; width 6'0"; height 6'0"; estimated cost \$40.;
 - (6) cold storage room, double-walled, dirt-filled; length 23'0"; width 16'0"; height 9'0"; estimated cost \$315.;
 - (7) machine shop; frame structure; length 48'6"; width 24'6"; height 11'0"; frame 6"x6" timbers; walls 1"x12" battened; rafters 2"x6" timbers; shingle roof; estimated cost \$1,065.;
 - (8) machine shop annex; length 17'5"; width 11'6"; height to eaves 11'3"; estimated cost \$136.;
 - (9) barn and lean-to; length 32'0"; width 24'0"; height to eaves 9'6"; estimated cost \$760.;
 - (10) storehouse #1; frame; length 26'0"; width 16'0"; height to eaves 7'6"; estimated cost \$269.;
 - (11) storehouse #2, frame; similar to #1, estimated cost \$242.;
 - (12) storehouse #3, frame; length 26'0"; width 24'0"; height to eaves 8'0"; estimated cost \$404.;
 - (13) storage shed; frame; length 23'0"; width 15'0"; height to eaves 8'0"; estimated cost \$128.;
 - (14) frame building, 12'x10'x8' to eaves; estimated cost \$87.;
 - (15) construction office, frame; length 16'0"; width 8'0"; height 9'7"; estimated cost \$112.;
 - (16) hose house, frame 7'x4'6"x5'6"; estimated cost \$14.;
 - (17) ice house, frame; length 23'0"; width 13'0"; height to eaves 7'; estimated cost \$130.;
 - (18) wash house, frame; length 24'; width 12'; height to eaves 9'; estimated cost \$458.;
 - (19) bunk house, frame, double-walled; rubberoid roofing; length 40'0"; width 12'0"; height to eaves 11'0"; estimated cost \$667.;
 - (20) bunk house; frame, 2" planks on 2"x6" studs outside; 1" T.&G. inside; 2" planks on roof with 1"x12"

over them; length 14'6"; width 12'6"; height to eaves 9'3"; estimated cost \$294.; (21 and 22) powder houses; two, double-walled frame buildings; length 9'6"; width 8'0"; height to eaves 7'0"; estimated cost \$115.; (23) house at Upper Operator's Cottage, length 10'0"; width 8', height 6'6"/9'; shed roof, rubberoid covered; estimated cost \$54.; (24) shed at borrow pit; frame, 14'x12'x8'/12'6"; estimated cost \$103.; (25) frame house; length 12'; width 8'; height to eaves 10'; estimated cost \$47.; (26) outdoor toilets estimated cost \$81.; (27) barn and shed, frame; length 58'0"; width 30'0"; height 13'0"; estimated cost \$417.00;

(d) Chief Operator's Cottage, 7-room frame bungalow, built in 1923., on foundations, etc., salvaged from former cottage destroyed by fire; cost of improvements, actual - of salvage, estimated; length 38'0"; width 32'0"; height to eaves 9'6".

2. Location of Structure with Reference to Project Area: On project property adjoining dam

Reference to map on which the structure or the project area therefor is shown: Exhibit J-K.

3. State whether on owned, leased, or Government land Owned

ITEMS OF COST		AMOUNT		
		ACTUAL	ESTIMATED	TOTAL
4. Direct and Indirect Costs				
(a) Upper Operator's Cottage		\$ 78	\$ 4,091	\$ 4,169
(b) Boarding house		1,048	8,951	6,999
(c) 27 Miscellaneous buildings			9,770	9,770
(d) Chief Operator's Cottage		5,954	1,072	7,026
<u>Overhead Costs</u>				
5. Engineering and Supt.	(A/c 390))			
6. Law Expenditures	(A/c 391))			
7. Injuries and Damages	(A/c 392))			
8. Taxes	(A/c 393))	110	3,787	3,847
9. Interest	(A/c 394))			
10. Miscellaneous Expenditures	(A/c 395))			
<hr/>				
11. Total Costs		\$7,190	\$24,621	\$31,811

SWAN FALLS DAM

HAER No. ID-20

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Name of Applicant Idaho Power CompanyStatement of Inventory and Original or Historical Cost as of July 31, 1925
of
PROJECT STRUCTURES LOCATED ON PROJECT AREAAccount No. 313, Title Hydraulic Power Plant StructuresItems
Fixtures and Grounds

1. General Description of Structure;

- (a) Bridge to Power House: Erected 1900-01; a wooden approach; length 95'0"; width 10'0"; supported by 33 bents of 8"x8" timbers bolted to concrete buttress wall along east bank of river.
- (b) Skip runway at West Section of Power House; an 8"x8" with a 35-lb. - 4' gauge track over which a wooden skip travels; panels mounted on each side of skip engage in 3" c.i. racks as bucket moves along; length 26'0"; width 5'3"; built in 1910.
- (c) Bridge Across Slough: length 18'0"; width 11'0"; consisting of 2-10"x10" and sills which support 10"x10"x18'0" stringers, over which 2"x12"x11'0" floor planking was laid; located over slough below power house on the northeast shore; built in 1910.
- (d) Island Retaining Wall; a battered concrete block wall; length 45'0"; width at top 3'0"; height at power house 11'0"; height at south end 5'0"; extends upstream from power house on northeast shore; built in 1910; volume of concrete 45 cu. yds.
- (e) Two Parallel Concrete Retaining Walls, extending upstream from power house along northeast shore; lower wall; length 640'0"; width 2'0"; average height 1'6"; upper wall, length 201'0"; width 2'0"; average height 2'0"; built in 1912-13; volume of concrete 101 cu. yds.
- (f) Water System: includes 5801' of various sized pipe, 4592' of which is buried and 1209' of which is boxed on ground surface; 934' is used in connecting the system with cottages and other buildings; these pipes interconnect five water tanks, two of concrete and three of wood, the concrete tanks being used primarily for plant cooling system; a well, concrete lined 20'0" deep and 8'0" diameter, with well house, frame, length 10'6"; width 10'6"; height to eaves 10'0" with reinforced concrete floor 12'8" below ground level; a 2½" two-stage Worthington pump and motor, Westinghouse, type COL, 440-V, 1120 RPM, Ser.#635892; built 1905-17.

- (g) Sewer System: includes 1260 linear feet of sewer tile, 720' of 6" pipe and 540' of 4" pipe. all lines buried in trenches 1'6" wide and 2'0" deep; built 1905-10.
- (h) Fences; 12 fences enclosing structures and a barbed wire fence to ferry;
- (i) Yard Lighting: includes poles, wire, hardware and fixtures to give lighting service to buildings and grounds, including line to ferry; also one flood light; built 1900-1912-13.

Reference to map on which the structure or the project area therefor is shown: Exhibit K.

3. State whether on Owned, Leased, or Government Land Owned

ITEMS OF COST	ACTUAL	AMOUNT	
		ESTIMATED	TOTAL
4. Direct and Indirect Costs			
(a) Bridge to power house		\$ 988	\$ 988
(b) Ekip runway		125	125
(c) Bridge across slough		65	65
(d) Island retaining wall		739	739
(e) Two parallel concrete walls	\$ 744	2,290	3,034
(f) Water system	1,551	8,198	9,749
(g) Sewer system		518	518
(h) Fences		420	420
(i) Yard lighting	27	2,902	2,929
<u>Overhead Costs</u>			
5. Engineering and Supt.	(A/c 390))		
6. Law Expenditures	(A/c 391))		
7. Injuries and damages	(A/c 392))		
8. Taxes	(A/c 393) }	3,483	3,483
9. Interest	(A/c 394))		
10. Miscellaneous Expenditures	(A/c 395))		
11. Total Costs	\$ 2,322	\$19,728	\$22,050

SWAN FALLS DAM

HAER No. ID-20

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Name of Applicant Idaho Power CompanyStatement of Inventory and Original or Historical Cost as of July 31, 1925
of

PROJECT WORKS CLASSIFIABLE UNDER ACCOUNTS

314, 315, 316, 317, 318, 334, 335, 336, 337, 338, 339, and 340

Account No. 314, Title Reservoirs, Dams and IntakesItems

1. General Description of Property:

- (a) Dam under east section power house; reinforced concrete structure; excavation all solid rock; trash racks and draft tubes for four units; built 1900 and 1906; shown on Exhibit L, sheets 1 and 4.
- (b) Dam under middle section power house: includes all work on headrace, draft tube and tailrace excavation for units #3, 4, 5 and 6; also construction of concrete draft tubes, trash rack walls and floor and the installation of steel gates and hoisting apparatus for said units; reinforced concrete construction; built 1900-01-12-13-17-18; shown on Exhibit L, sheets 1 and 3.
- (c) Dam under west section power house; includes all head and tailrace excavation for units #1 and 2 and the exciter; also construction of concrete draft tubes and forebay walls; also installation of trash racks and feeder gates and hoisting mechanism; built 1900-1; 1910, 1912-15; shown on Exhibit L, Sheets 1 and 2.
- (d) Concrete dam and bypass; extends from east end of power house to east shore; a reinforced concrete structure, length 158'6"; width at top 5'0"; height 25'0"; containing about 1500 cu. yds. concrete equipped with two by-pass gates, 18'9"x12'6 3/4"; built up vertical sliding; built 1900-01 and 1912-13; shown on Exhibit L, sheet 1.
- (e) Overflow timber crib dam; original dam with concrete abutments constructed 1900-01; in 1916-17 the rock filling in cribs was replaced with rubble concrete, reinforcing piers set back of dam, and concrete was poured at toe to prevent erosion; width 5'6"; width at bottom 60'0"; height 17'0"; length 425'0"; shown on Exhibit L, sheet 5.
- (f) Controlling gates on dam: Twenty - tainter gates on crest of overflow timber crib dam 7 1/2' x 12".
- (g) Enlarging openings to wheel pits #7, 8, 9 and 10.
- (h) Fish ladder: concrete structure located between by-pass dam (1) and power plant; consists of 11 pools, 6' wide and 6'2" long; drop between pools 2'; ports 2' wide located on alternate sides.

SWAN FALLS DAM

HAER No. ID-20

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- (1) Gate hoist motor: for operating tainter gates on overflow dam; C.E. 5 hp, type MT, Form C2, 6 $\frac{1}{2}$ amp., 440 v., 3 phase, 1620 rpm, 5 hp, #238965; installed in 1921.

ITEM OF COST	AMOUNT		
	ACTUAL	ESTIMATED	TOTAL
2. Direct and Indirect Costs			
(a) Dam - East section	\$ 288	\$ 50,151	\$50,439
(b) Dam - Middle section	55,078	101,327	156,405
(c) Dam - West section	3,417	43,295	46,712
(d) Concrete dam and by-pass		31,356	31,356
(e) Overflow timber crib dam		121,995	121,995
(f) Control gates on dam	110,839		110,839
(g) Enlarging wheel pit openings	1,411		1,411
(h) Concrete fish ladder	4,274		4,274
(i) Gate hoist motor	352		352
<u>Overhead Costs</u>			
3. Engineering and Supt.	(A/c 390)		
4. Law Expenditures	(A/c 391)		
5. Injuries and damages	(A/c 392)	5,645	76,458
6. Taxes	(A/c 393)		82,103
7. Interest	(A/c 394)		
8. Miscellaneous Expenditures	(A/c 395)		
9. Total Costs	\$151,304	\$424,582	\$405,886

SWAN FALLS DAM
HAER No. ID-20
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Name of Applicant Idaho Power CompanyStatement of Inventory and Original or Historical Cost as of July 31, 1925
of

PROJECT WORKS CLASSIFIABLE UNDER ACCOUNTS

314, 315, 316, 317, 318, 324, 335, 336, 337, 338, 339 and 340

Account No. 317, Title Forebays, Penstocks and TailracesItems

1. General description of property as to kind, location, size, type, date constructed, etc.:

Tail Race Excavation: This excavation consisted principally of cutting a channel thru an island downstream from the east section of the power house. The work was done with a drag-line scraper.

2. Year purchased _____ Year built or installed 1917-183. Map or maps on which location of property is shown: Ex. K

ITEMS OF COST	AMOUNT		
	ACTUAL	ESTIMATED	TOTAL
4. Direct and Indirect Costs:			
Tail Race Excavation 1917-18	\$ 8,506	\$	\$ 8,506
Indirect costs		2,126	2,126
<u>Overhead Costs</u>			
5. Engineering and Supt.	(A/c 390)		
6. Law Expenditures	(A/c 391)		
7. Injuries and damages	(A/c 392)		
8. Taxes	(A/c 393)		
9. Interest	(A/c 394)		
10. Miscellaneous expenditures	(A/c 395)		
		1,998	1,998
11. Total Costs	\$8,506	\$4,124	\$12,630

SWAN FALLS DAM

HAER No. ID-20

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Name of Applicant Idaho Power CompanyStatement of Inventory and Original Or Historical Cost as of July 31, 1925
of

PROJECT WORKS CLASSIFIABLE UNDER ACCOUNTS

314, 315, 316, 317, 318, 334, 335, 336, 337, 338, 339 and 340

Account No. 318, Title Production Roads and TrailsItems

1. General description of property:

- (a) Three roads viz: North Side Road, from boarding house to rim rocks at top of canyon; 5300' long and ruling width of 12'; steep canyon side road, much of which excavated from solid lava; South Side Road, from South Ferry landing to rim rock; 8000' long and ruling width 14'; physically similar to North Side Road. Ferry-Dam Road, from south ferry landing to southwest abutment of overflow dam; 1800' long and ruling width of 14'; built 1900-02.
- (b) Ferry boat and equipment; a flat-bottomed boat, constructed of heavy timber and planks, reinforced with round tie rods; length 45'0"; width 20'0"; depth 3'4"; draft 1'0"; electric drive consists of trolley tower 24'0" high, supporting 3 trolley wheels which engage 3 overhead power cables and actuate motor, which in turn operates a single paddle wheel 28" wide and 6' in diameter; operated across Snake River 1/2 mile above power house; built in 1917-18; new boat in 1922.

2. Map or maps on which location of property is shown: Exhibit X

ITEMS OF COST	AMOUNT		
	ACTUAL	ESTIMATED	TOTAL
3. Direct and Indirect costs			
(a) Three roads		\$ 11,060	\$ 11,060
(b) Ferry			
boat	\$ 3,978		3,978
electric drive	95	1,455	1,550
Overhead costs			
4. Engineering and supt.	(A/c 390)		
5. Law expenditures	(A/c 391)		
6. Injuries and damages	(A/c 392)		
7. Taxes	(A/c 393)	277	2,351
8. Interest	(A/c 394)		2,628
9. Miscellaneous expend.	(A/c 395)		
10. Total costs	\$4,350	\$14,866	\$19,216

Name of Licensee or Applicant Idaho Power CompanyStatement of Inventory and Original or Historical Cost as of July 31, 1925.
ofPROJECT EQUIPMENTAccount number 319, Title Water Turbines and Water WheelsItems

1. General description:

- (a) Turbine units #1 and 2: two Allis-Chalmers, Type BV7, horizontal, double runner, side discharge; 1030-brake horse power each; 120 r.p.m.; 17' head; installed in Swan Falls power house in 1911; together with 2 Lombard governors, complete, with a 4" x 6" triplex plunger oil pump belt driven from a counter shaft geared to turbine shaft; all new when installed.
- (b) Turbine units #3, 4, 5, and 6: Four I.P. Morris vertical single runner, bottom discharge, 1750 h.p.; 90 r.p.m.; 21' head; also one exciter turbine, 350 h.p.; 190 r.p.m.; also four, double floating lever governors for the main turbines and one, Pelton type B, #224 governor for exciter; also governor oil pumps (Dean) geared to Westinghouse 20 h.p., 440-v motor; also appurtenant fittings material and spare parts; also two G.E. electric starting panels, automatic, pressure regulated for above named 20-h.p. Westinghouse motor; 2 installed 1913 and 2 in 1918; new.
- (c) Turbine units #7, 8, 9 and 10: Four, Wellman Beaver Morgan vertical, single runner, bottom discharge; each 1100 H.P.; 109 r.p.m.; 21' head; no governors; installed new in 1918.
- (d) One American Steam Pump Company air compressor, #38366; 3" x 1 $\frac{1}{2}$ " x 3" direct connected to G. E. induction motor, type KT-140-6, 2 H.P., 1200 r.p.m., 3 phase, 60-cycle, 440-v, #1520915; installed new in 1918.
- (e) Raising thrust bearings on unite #1 and 2 and installing sump pump; Byron Jackson, vertical rotary, 5" x 14" with 10' chained suspension frame and pulley. Installed new in 1920.
- (f) Governor system equipment, viz: (1) air receiver belting, circuit breakers and miscellaneous equipment, installed 1911-1918; (2) rotary oil pump for governors, Woodward Governor Co., 125 gal., complete with 20 h.p., 440-v, 1200 r.p.m. motor; installed new in 1923; (3) pressure and vacuum tank for Lombard governor installed new in 1923; (4) motor for governor oil pump, G.E., Type KT-731 induction 5-H.P., 60-cycle, 3-ph., 440-V, 1800 r.p.m., #1787668-50⁰; installed new in 1920.

Items of cost	Amount		
	Actual	Estimated	Total
2. Direct and Indirect Costs			
(a) Turbine units #1 and 2	\$ 25,200.00	\$ 12,717.00	\$ 37,917.00
(b) " " #3,4,5 & 6	110,729.00	25,273.00	136,002.00
(c) " " #7,8,9 & 10	89,193.00	12,487.00	101,680.00
(d) Air compressor	415.00	58.00	473.00
(e) Thrust bearings and sump pump	4,147.00		4,147.00
(f) Governor equipment	3,368.00	498.00	3,866.00
Overhead Costs			
3. Engineering and supt. (A/c 390)			
4. Law expenditures (A/c 391)			
5. Injuries and damages (A/c 392)			
6. Taxes (A/c 393)	202.00	48,897.00	49,099.00
7. Interest (A/c 394)			
8. Miscellaneous expenditures (A/c 395)			
Total costs	\$233,254.00	\$99,930.00	\$333,184.00

Form 11-47

Project No. 503.

Name of Applicant Idaho Power Company

Statement of Inventory and Original or Historical Cost as of July 31, 1925.
of

PROJECT EQUIPMENT

Account number 320, Title Electrical Equipment - Hydro

Items

1. General description of unit or units of equipment.

- (a) Generator units #1 and 2: two Westinghouse, vertical, 2200-v; 3-ph.; 60-cycle; 120 r.p.m.; 850 K.V.A. each, Serial 842415 and 842416; direct connected to turbines #1 and 2; installed new in 1911.
- (b) Generator units #3 and 4: two Westinghouse vertical 2200-v; 3-ph.; 60-cycle; 90 rpm; 1250 K.V.A. each; Serial 1112839 and 1112840; direct connected to turbines #3 and 4; installed new in 1913.
- (c) Generator units #5 and 6: two Westinghouse, vertical 2200-v; 3 ph.; 60-cycle; 90 rpm; 1562 K.V.A.; Serial #2023333 and 2023334; direct connected to turbines #5 and 6; installed new in 1918.
- (d) Generator units #7, 8, 9 and 10; four, G.E. vertical 2200-v; 3-ph.; 60-cycle; 190 rpm; 800 K.V.A.; Type A T B, serial numbers 1353064-5-6-7; direct connected to turbines #7, 8, 9 and 10; installed new in 1918.
- (e) Synchronous condenser: one Westinghouse; 550-v; 2-ph.; 60 cycle; 257 rpm; 700 K.W. electric generator, serial #469836; with a 40 kw. 125-v exciter mounted on generator shaft; located near unit #7 in plant; installed new in 1907.
- (f) Motor-generator set, Westinghouse; consisting of one 25-hp; 440-v; 3-ph.; 1135 rpm; type CGL motor direct connected to 22½ kw.; 125-v; direct current generator for battery charging; motor serial #1122234; generator serial #36639; located on downstream western corner of power house on generator floor; installed new in 1912.
- (g) Motor-generator set, Westinghouse; consisting of one type CGL, 112-hp; 440-v; 3-ph; 60-cycle; induction motor direct connected to one 75 kw; 125-v; 850 rpm; direct current shunt-wound generator; motor serial #851959; generator serial #851957; located on generator floor just west of Unit #1; installed new in 1910.
- (h) Motor-generator set, Westinghouse; consisting of type CGL, 2200-v; 3-ph.; 60-cycle 435-hp; induction motor direct connected to a 300-kw; 125-v; 720 rpm; direct current generator; motor serial #2224240; located near Unit #1; installed new in 1918.
- (i) One Westinghouse, vertical, 200-kw; 125-v; 190 rpm; D.C. generator used as an exciter; Serial #1129293; direct connected to one 350-hp; Q.P. Morris exciter turbine; installed new in 1913.

- (j) Wiring - all cables wire and conduit used in plant, viz: 28598 feet of conductor of various types and sizes; 12810 ft. of iron conduit; 3326 ft. of fibre conduit; 16 galvanized sheet iron junction boxes of various sizes; 2 conduit steel outlet boxes - Western Electric; 4 spool insulators; 1 wooden junction box; 114 condulets, porcelain, of various types and diameters; miscellaneous bushings and locknuts.
- (k) Switchboards; Westinghouse: (1) 13 Meter Panels, one of marble and 12 of slate; equipped with 12-overload relays; 23-ammeters; 10-wattmeters; 10-power factor meters; 2-frequency meters; 3-volt meters; (2) Transit Board Panels with 1-temperature indicator, 1-deal switch, 1-baby knife switch; (3) Bench-board with 12 panels containing: 12-synchronizing receptacles; 11-dial type switches; 37 drum type control switches; 3 sets miniature bus bars with dummy plugs; 8-potential receptacles; 7-frequency receptacles; 4-volt meter receptacles; 6-ammeter jacks; 2-remote control handles; 2-plug switches; 24-card holders; indicating lamps; (4) Upright Board with 7 panels containing: 16-ammeters; 12-overload relays; 11-drum type control switches; 4 watthour meters; 1 miniature busbars; 1-watt meter; 3-field rheostats; 1 volt meter; 1-auto starting switch; 1-voltage regulator; (5) Miscellaneous switchboards with appurtenant fixtures, viz: 1-motor starting panel; 1-distribution panel for control circuits; 7-panels for electrically operated circuit breakers; 1-four panel D.C. board; 2-local distribution panels; 1-pump room panel; 1 temperature indicating panel. Installed new, 1910-1920.
- (l) Instrument transformers added to switchboard at various times and not included in switchboard contracts: all Westinghouse equipment; 34-current transformers of various characteristics; 22-potential transformers, style 1173375; 2000/100-v; installed new, 1906-18.
- (m) Miscellaneous switchboard equipment, Westinghouse, viz: one single phase synchroscope #29944; 2-volt meters, type SM, style D016071; one knife switch; 3-time element overload relays, style #2142370; 3-Type O.D. fuse blocks, style S0478460; one fuse pole; 2-current transformers serial #319340; 6-static interrupters style S0247096; one oil circuit breaker; 4 G.E. polyphase curve drawing watt meters; miscellaneous strap copper and porcelain tubes; 2 solenoids for voltmeter; installed new, 1906-19.
- (n) Circuit breakers; 19-Westinghouse and one G.E. of various types and styles; installed new in 1918, except 4, dates of which are indefinite.
- (o) Low tension disconnecting switches: all Westinghouse; 74-switches of various types and styles; installed new in 1913 and 1918.
- (p) Local service power transformers; 3-Type H, Form K, General Electric transformers; 75 K.V.A.; 2200/440/220-v; installed new in 1918; 1 G.E. 50 K.V.A., 2300/440 v, single phase transformer installed in 1925.
- (q) Storage battery room and equipment, installed new in 1921.

Items of Cost	Amount		
	Actual	Estimated	Total
2. Direct and Indirect Costs			
(a) Generator units #1 & 2	\$17,200.00	\$ 5,068.00	\$ 22,268.00
(b) " " #3 & 4	25,587.00	4,564.00	30,151.00
(c) " " #5 & 6	37,138.00	8,009.00	45,147.00
(d) " " #7, 8, 9, & 10	50,772.00	7,109.00	57,880.00
(e) Synchronous condenser	6,975.00	1,610.00	8,485.00
(f) Motor-generator set	1,175.00	292.00	1,467.00
(g) Motor-generator set	1,735.00	635.00	2,370.00
(h) Motor-generator set	7,250.00	2,107.00	9,357.00
(i) Exciter set	1,800.00	448.00	2,248.00
(j) Wiring		8,518.00	8,518.00
(k) Switchboard	30,226.00	8,431.00	38,657.00
(l) Instrument transformers		1,782.00	1,782.00
(m) Miscellaneous switchboard equipment	79.00	3,525.00	3,604.00
(n) Circuit breakers		5,366.00	5,366.00
(o) Low tension disconnecting switches		2,188.00	2,188.00
(p) Local service power transformers	160.00	1,787.00	1,947.00
(q) Storage battery room and equipment	1,100.00		1,100.00
Overhead Costs.			
3. Engineering and supt. (A/c 390)			
4. Law expenditures (A/c 391)			
5. Injuries and damages (A/c 392)			
6. Taxes (A/c 393)		42,643.00	42,643.00
7. Interest (A/c 394)			
8. Miscellaneous expend. (A/c 395)			
Total costs	\$181,097.00	\$104,081.00	\$285,178.00

Form 11-47

Name of Applicant Idaho Power Company

Statement of Inventory and Original or Historical Cost as of July 31, 1925.
of

PROJECT EQUIPMENT

Account number 322. Title Other Power House Equipment - Hydro

Items

1. General description of unit or units of equipment:

- (a) Iron pipe and fittings: all inside power house for transformers, bearings, governors, air and oil systems except that furnished by Wm. Cramp & Sons Co. under contract of 1912-13; total 16711 pounds; installed new.
- (b) Brass pipe and fittings: same uses and same exception as in (a) above; total 7815 pounds; installed new.
- (c) Pumps and motors, including pulleys and belts used in power house in connection with water supply system: includes 2 American Well Works single stage 2½" centrifugal pumps and 2 Westinghouse motors, Type CCL, 10-hp, 440-v, 1120 r.p.m.; 1-Gould 5" x 6", fig. 957 triplex pump and 1 Westinghouse motor, type C, 5 hp; 1-Worthington 2½", 4-stage pump with Westinghouse motor, Type CCL, 30-hp, #375584; also counter shaft pulleys, belts and hangers; installed new in 1911 and 1913.
- (d) Oil system: includes overhead and sump tanks with starters, motors, brass and iron pipe fittings; installed new in 1916.
- (e) Hangers: used in connection with water and oil systems; 2014 pounds strap iron and bolts.

Items of Cost	A M O U N T		
	Actual	Estimated	Total
2. Direct and Indirect Costs			
(a) Iron pipe and fittings		\$1,618.00	\$1,618.00
(b) Brass " " "		1,029.00	1,029.00
(c) Pumps and motors	\$1,394.00	1,714.00	3,108.00
(d) Oil system	2,378.00	613.00	2,991.00
(e) Hangers		229.00	229.00
Overhead Costs			
3. Engineering and Supt. (A/c 390)			
4. Law expenditures (A/c 391)			
5. Injuries and Damages (A/c 392)		1,586.00	1,586.00
6. Taxes (A/c 393)			
7. Interest (A/c 394)			
8. Miscellaneous expend. (A/c 395)			
Total costs	\$3,772.00	\$6,789.00	\$10,561.00

Form 11-47

Project No. 503.

Name of Applicant Idaho Power Company

Statement of Inventory and Original or Historical Cost as of July 31, 1925.
of

PROJECT EQUIPMENT

Account number 323, Title Miscellaneous Power Plant Equipment - Hydro

Items

1. General description of unit or units of equipment:

- (a) Machine shop equipment: includes lathe, drill press, bolt cutter, pipe machine, motors, power hacksaw and miscellaneous; located in machine shop; new in 1910.
- (b) Ice plant: includes F. W. Wolfe & Co. 4" x 8" single cylinder, single acting compressor and fittings, driven by a G. E. 10-hp, 220-v motor; brine tanks 18' x 2' x 3', 12-ice cans, 12" x 12" x 24"; ammonia coils, pipe and fittings; installed new in 1913.
- (c) Miscellaneous equipment: includes (1) 865' cable and wire of various sizes; (2) 367 lbs. stranded cable, various kinds; (3) one 3-kva and one 5 kva Westinghouse transformers, 2300-v; (4) 3 - 7½-hp Westinghouse motors and one 3 hp Westinghouse motor; (5) 2 G. E., 2300-v transformers, 1 - 7½ kva and 1 - 5 kva; (6) 3 - G. E. watt-hour meters; (7) one Western Electric voltmeter, a-c and d-c; (8) one Weston d-c voltmeter; (9) one current transformer, 80-5 amp; (10) one potential transformer 500/100 v; (11) one Byron Jackson, motor driven, 4-stage centrifugal pump, 2½" discharge, 3½" suction complete with G.E. 30 hp motor, type KT-312, form B, 440 v, 1735 rpm, 3 ph., installed 2nd hand in 1924; (12) one Westinghouse 20 hp motor, type CCL, 2nd hand in 1924; (13) one 15 cu. ft. Ransom concrete mixer complete with 10 hp motor, 2nd hand in 1924; (14) miscellaneous small tools, ropes, chains, fire extinguishers, 66 kv and 44 kv arrester terminals, etc.
- (d) Yard cranes and tracks: 2 cranes, 30# rails and 2 hand trucks.
- (e) Dodge ¾ ton truck purchased in 1923.
- (f) Telephone equipment: 2 desk, 2 wall and 2 extension sets with 5-panel switchboard, one booth and appurtenant equipment.

Items of cost	A m o u n t		
	Actual	Estimated	Total
2. Direct and Indirect Costs			
(a) Machine shop equipment		\$2,848.00	\$2,848.00
(b) Ice plant	\$439.00	563.00	1,002.00
(c) Miscellaneous equipment	1,133.00	4,866.00	5,999.00
(d) Yard cranes		1,201.00	1,201.00
(e) Dodge truck	1,075.00		1,075.00
(f) Telephone equipment		338.00	338.00
Overhead Costs			
3. Engineering & Superintendence (A/c 390)			
4. Law expenditures (A/c 391)			
5. Injuries and damages (A/c 392)			
6. Taxes (A/c 393)			
7. Interest (A/c 394)			
8. Miscellaneous expenditures (A/c 395)			
Total costs	\$2,647.00	\$9,816.00	\$12,463.00

Form 11-46

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Name of Applicant Idaho Power Company

Statement of Inventory and Original or Historical Cost as of July 31, 1925.
of

PROJECT STRUCTURES LOCATED ON PROJECT AREA

Account number 332, Title Transmission Substation Structures

Items

1. General description of structure:

Transformer house. This is a wooden building attached to the west end of the concrete building and houses 2 - 44000/22000/2200 v Westinghouse transformers.

2. Location of structure with reference to project area Southwest corner of Power Plant

Reference to map on which the structure or the project area therefor is shown:
Exhibit L-sheet 1.

3. State whether on owned, leased, or Government land Land owned by Idaho Power Co.

4. Year built 1919-20. Year acquired if purchased second hand _____

Items of cost	A m o u n t		
	Actual	Estimated	Total
5. Direct and Indirect Costs:			
Material delivered at plant	\$75		\$75
Labor Erecting	243		243
Sub total			316
Indirect Costs	58		58
Total			374
Overhead Costs .			
6. Engineering and superintendence (A/c 390)			
7. Law expenditures (A/c 391)			
8. Injuries and damages (A/c 392)			
9. Taxes (A/c 393)	16		16
10. Interest (A/c 394)			
11. Miscellaneous expenditures (A/c 395)			
12. Total costs	\$390		\$390

Name of Applicant Idaho Power Company

Statement of Inventory and Original or Historical Cost as of July 31, 1925.
of

PROJECT EQUIPMENT

Account number 333, Title Transmission Substation Equipment

Items

1. General description of unit or units of equipment:

- (a) Instrument transformers, Westinghouse, used in connection with the tripping of transmission line oil circuit breakers and metering of input and output; includes (1) Two, Type L, 200/5-amp, 33000-v current transformer, style 125100; (2) two 44000/22000/110-v 100-watt, style S.O. 396310 potential transformers; (3) two 44000-v, 100-5 amp., style #436850, serial #287952 and 287953 current transformers; (4) three 66000-v, 100-5 amp., style 158737 B, serial 256219-20-21 current transformers; (5) three 66000/44000/110-v, 100 amp, style S.O. 478459 potential transformers; installed in power house; new 1900-1919.
- (b) Oil circuit breakers: (1) Three Westinghouse Type G. A. 300-amp, 66000-v, electrically operated, remote control, style 80478367; (2) One G. E., type P, form k26, 500-amp., 45000-v, M.L. 1699569, G-1, electrically operated, remote control, serial #446563; in power house; new 1900-1919.
- (c) Power transformers: (1) Two, Westinghouse, 500-kw, O.I.W.C., single phase, 44000/22000/500/2200-v, spec. #52099; (2) seven 250-kva, O.I.W.C. single phase, 44000/2200-v, Spec. 85262 A; (3) three 850-kva, O.I.W.C. single phase 44000/66000/2100/2200/2300-v Spec. 64259; (4) three 2000 kva, O.I.W.C. single phase, 66000/2300/2185/2070-v, Spec. #156994; (5) One 250-kva, O.I.W.C. single phase, 44000/2200-v, Spec. #75702; (6) one extra set of coils.
- (d) High tension wiring: (1) 857 lbs. solid bare copper wire, #00 and #4; (2) 939' copper tubing; (3) 268' brass tubing; (4) 45 assortment connectors of various types and sizes; (5) 148 insulators and 106 supports and tie pins; (6) 49 disconnecting switches; (7) 4 circuit breakers; (8) 9 choke coils; (9) 3 voltage detectors; (10) 15 slate entrance insulators; (11) 12 steel ridge irons; (12) Miscellaneous steel iron and timber used in installing high tension equipment; installed new 1900-1919.
- (e) High tension lightning arresters: Two Westinghouse 3-ph., Type A, electrolytic; 13000-27500 and 63500-73500 volt, style #492712, installed in 1911; also two G.E., Cat. #78892 and #79978, 3-ph., type I, form C-2, 43000-48250 and 37900-48250 volt; installed in 1913 and 1916 respectively.

- (f) Reinforced concrete water tanks; (1) One circular, inside dia. 12'0", height 12'0", wall thickness 0'8"; installed on island at west end of power house in 1912; (2) One rectangular; length outside 15'4"; width outside 13'0"; height inside 13'2"; wall thickness 0'7"; on island, installed in 1910.
- (g) (1) Current transformer for Gem line 66 kv, oil switch, installed new 1924; (2) one set charging jacks installed new 1922.

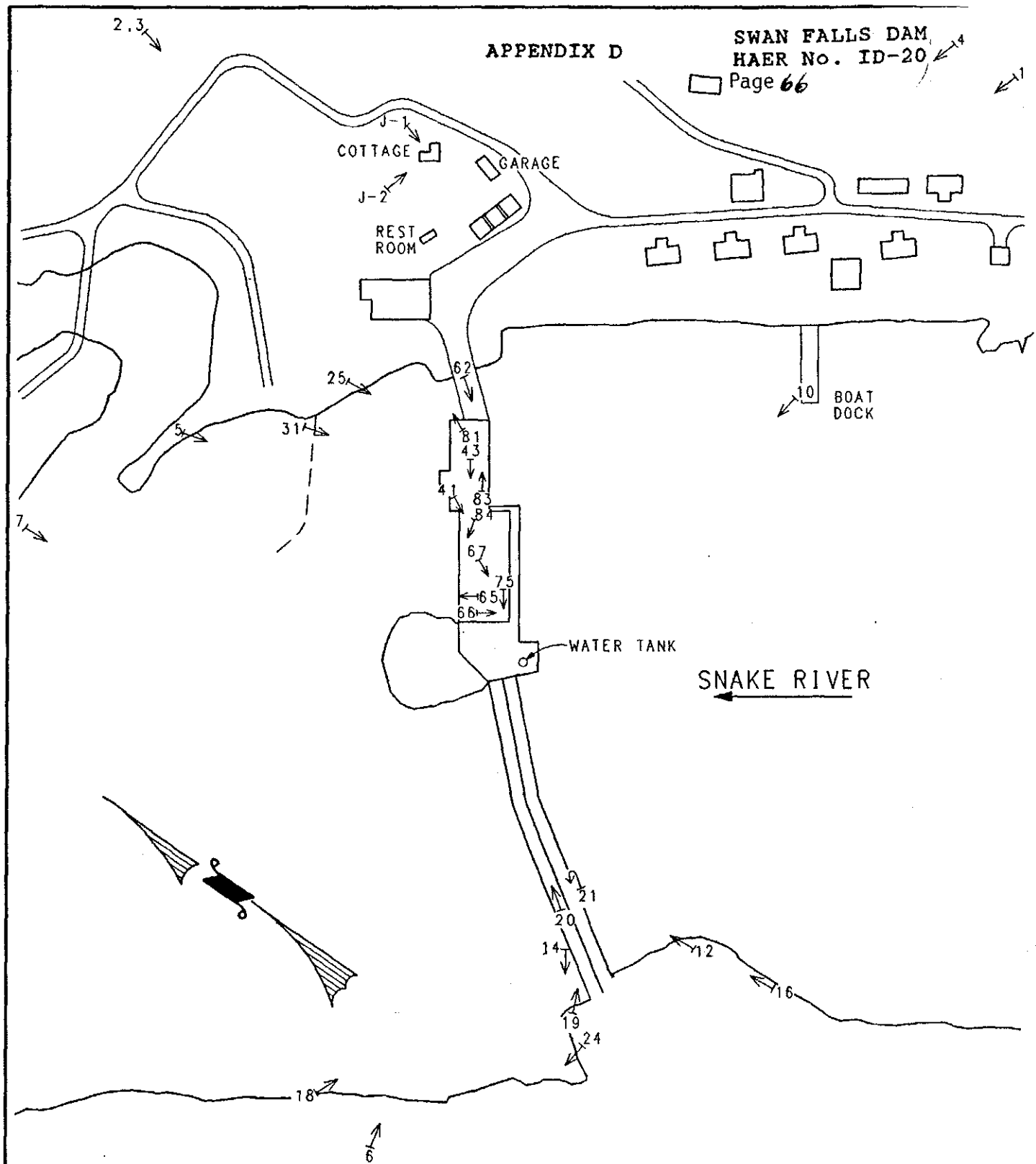
Items of cost.	Amount		
	Actual	Estimated	Total
2. Direct and Indirect Costs			
(a) Instrument transformers		\$4,473.00	\$4,473.00
(b) Oil circuit breakers		4,657.00	4,657.00
(c) Power transformers	\$32,933.00	12,023.00	44,956.00
(d) High tension wiring		9,363.00	9,363.00
(e) " " lightning arresters	3,535.00	1,761.00	5,296.00
(f) Reinforced concrete water tanks		1,558.00	1,558.00
(g) Current transformer & charging jacks	577.00		577.00
<u>Overhead Costs</u>			
3. Engineering and supt. (A/c 390)			
4. Law expenditures (A/c 391)			
5. Injuries and damages (A/c 392)			
6. Taxes (A/c 393)		12,428.00	12,428.00
7. Interest (A/c 394)			
8. Miscellaneous expend. (A/c 395)			
9. Total Costs	\$37,045.00	\$46,263.00	\$83,308.00

Name of Licensee or Applicant IDAHO POWER COMPANYStatement of Original or Historical Cost as of July 31, 1925
of
OVERHEAD ITEMSAccount Number 390, Title Engineering & Superintendence During Constr.

ITEMS

1. Detail analysis of costs charged to the above designated overhead account that are to remain permanently therein and which are not subject to distribution to other fixed capital accounts.

ITEMS OF COST			A M O U N T		
			Actual	Estimated	Total
Surveying, mapping and preparing exhibits for Federal Power Commission filings:			\$5,379		\$5,379
Year	E.R. #	Amt.			
1922	220	\$4,378.08			
1923	284	565.79			
1924	319-B	435.60			
Total		\$5,379.47			
Total Costs			\$5,379		\$5,379



PHOTOGRAPHIC NUMBERS

ID-20-1 to 7	ID-20-43
ID-20-10	ID-20-62
ID-20-12	ID-20-65 to 67
ID-20-17	ID-20-75
ID-20-14 to 16	ID-20-81
ID-20-18 to 21	ID-20-83 to 84
ID-20-24 to 25	ID-20-J-1
ID-20-31	ID-20-J-2
ID-20-41	

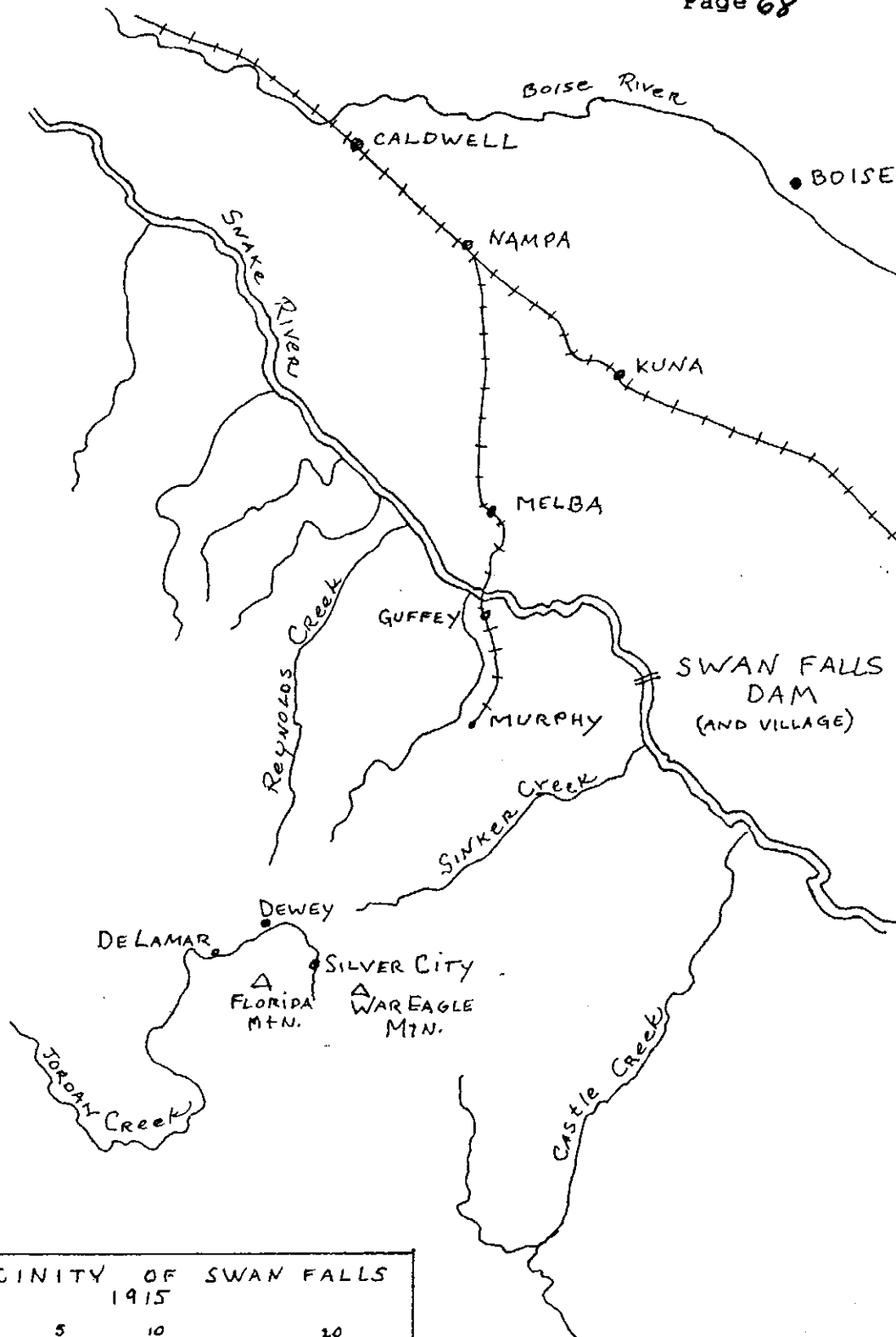
KEY MAP TO ACCOMPANY PHOTOGRAPHIC
INDEX OF THE SWAN FALLS H.A.E.R. REPORT

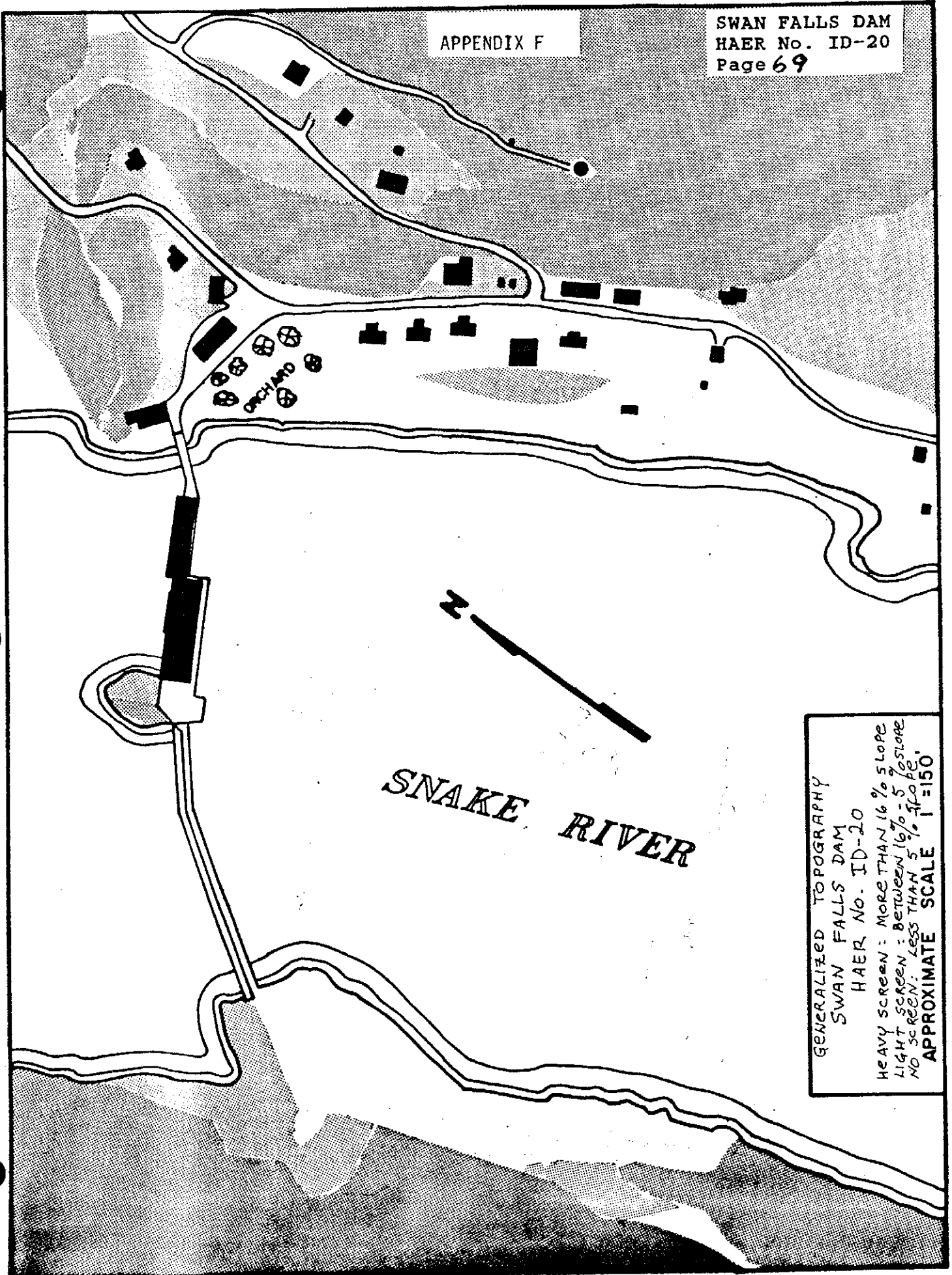
HAER-ID-20

SCALE:

DATE: 11-13-90

CAD-A-732 SWPO MAP 1

VICINITY OF SWAN FALLS
19150 5 10 20
SCALE IN MILES



GENERALIZED TOPOGRAPHY

SWAN FALLS DAM

HAER No. ID-20

HEAVY SCREEN: MORE THAN 16% SLOPE
LIGHT SCREEN: BETWEEN 16% - 5% SLOPE
NO SCREEN: LESS THAN 5% SLOPE
APPROXIMATE SCALE 1"=150'

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